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Bayne-Jones Army Community Hospital secured funding to hire additional staff members to open a third operating room on a consistent basis. According to the guidelines published in the fiscal year 2006 Medical Command funding guidance, Bayne-Jones Army Community Hospital must show an increase in workload of 1,202 Relative Weighted Products (RWPs) and 12,592 Relative Value Units (RVUs) by October of 2006 to sustain this funding increase in fiscal year 2007. Despite the increase in funding, a third operating room has not consistently been scheduled or utilized and it is believed that other factors may be impacting operating room utilization. The process improvement methodology of Lean Six Sigma provides a basis for an analysis of potential factors contributing to low operating room utilization. Recommendations for achieving RVU and RWP goals include establishing a target of 80% utilization by each surgical service; data collection, monitoring, and reporting; and improving space management by shifting patient locations during phase I and/or phase II post anesthesia recovery.

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Graduate Management Project

Lean Six Sigma: Optimizing Operating Room Utilization at Bayne-Jones Army Community Hospital

by

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U.S. Army Baylor University Graduate Program in

Health Care Administration

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Abstract

Bayne-Jones Army Community Hospital secured funding to hire additional staff members to open a third operating room on a consistent basis. According to the guidelines published in the fiscal year 2006 Medical Command funding guidance, Bayne-Jones Army Community Hospital must show an increase in workload of 1,202 Relative Weighted Products (RWPs) and 12,592 Relative Value Units (RVUs) by October of 2006 to sustain this funding increase in fiscal year 2007. Despite the increase in funding, a third operating room has not consistently been scheduled or utilized and it is believed that other factors may be impacting operating room utilization. The process improvement methodology of Lean Six Sigma provides a basis for an analysis of potential factors contributing to low operating room utilization. Recommendations for achieving RVU and RWP goals include establishing a target of 80% utilization by each surgical service; data collection, monitoring, and reporting; and improving space management by shifting patient locations during phase I and/or phase II post anesthesia recovery.

Disclaimer

The views expressed in this paper are those of the author and do not reflect the official policy of the Department of the Army, Department of Defense, or the United States Government.

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LEAN SIX SIGMA: OPTIMIZING OPERATING ROOM UTILIZATION AT BAYNE-JONES ARMY COMMUNITY HOSPITAL

Introduction

Conditions that prompted the study

Bayne-Jones Army Community Hospital (BJACH) is a 35 bed facility located at Fort Polk, Louisiana. A small Army installation in a rural community, Fort Polk is home to the premier training center for light infantry and special operations units. BJACH provides a myriad of services to a diverse population. Approximately 3,500 soldiers on average, per month, rotate through Fort Polk to conduct realistic training (Joint Readiness Training Center and Fort Polk Web Site, 2005). Approximately 3,858 soldiers have mobilized/demobilized from 22 different units through Fort Polk since October 2004 to support Operation Enduring Freedom, Operation Noble Eagle, and Operation Iraqi Freedom (M. Mangia, personal communication, October 3, 2005). As of July 2005, BJACH has 22,933 enrollees, consisting primarily of active duty Army, active duty family members and family members of retirees (see Appendix A). The Command recognizes the importance of providing continuous quality and cost-efficient outpatient and inpatient services to support soldier training and exuding fiscal responsibility with Defense Health Program dollars.

On November 9, 2005, the Commander of the U.S. Army Medical Command (MEDCOM) published his resourcing priorities in the initial funding guidance. In order of importance, these priorities include supporting the Global War on Terrorism, supporting Army transformation and delivering more health care in Army Treatment Facilities. "Actions that result in more health care being delivered in Army Treatment Facilities, at an acceptable rate of return,

will take resource priority over those who do not" (Spencer, 2005, p.1). BJACH abides by this guidance to sustain core and essential operations.

A complimentary opportunity to secure additional funding, addressed in the FY 06 MEDCOM funding guidance, occurred in August of 2005. Under "Jump start," a MEDCOM initiative to increase healthcare delivery, Medical Treatment Facilities (MTFs) could request funding for specific projects during FY 05, with the understanding that the projects would continue to be funded if the facility could show an increase in workload over FY 05 baselines by the following fiscal year. An analyst in the BJACH Resource Management Division submitted three proposals that were approved by MEDCOM. It was recognized that "Surgery is the financial engine that drives a significant portion of the cost and revenues in a hospital" (Lovejoy & Li, 2002, p.1). Therefore, two of these proposals involved increasing the daily number of surgeries performed in the operating suite (see Appendix B). Funding was requested and obtained for an additional anesthetist and an obstetric nurse practitioner or midwife to facilitate opening a third operating room on a consistent basis; thereby increasing surgical procedures for FY 06. BJACH must show an increase in workload of 1,202 Relative Weighted Products (RWPs) and 12,592 Relative Value Units (RVUs) by October of 2006 to receive an additional $681,000 in FY 07.

Statement of the problem

Although Bayne-Jones Army Community Hospital received additional funding, a third operating room has not been consistently scheduled or utilized during FY 06. Without taking measures to increase operating room utilization, it is highly unlikely that BJACH will achieve RVU and RWP goals. Given an unchanging patient population, the need was identified to

determine additional factors impacting operating room utilization and provide recommendations for an appropriate solution.

Literature Review

Lean Six Sigma is a process improvement methodology that combines the benefits of Six Sigma tools with Lean manufacturing concepts in order to reduce process times and variation, resulting in an overall reduction in cost and improvement in quality. Six Sigma involves specialized statistical tools, whereas Lean manufacturing is an enterprise system that is incapable of being a stand alone process. "Lean Six sigma is a methodology that maximizes shareholder value by achieving the fastest rate of improvement in customer satisfaction, cost, quality, process speed, and invested capital" (George, 2002, page xii).

Six Sigma

Six Sigma is a quality control methodology that measures performance using statistical concepts and terminology. In the early 1980's, Motorola created the Six Sigma process as a strategy to generate performance excellence by improving product quality and job processes while reducing costs. Other companies such as General Electric and Hewlett Packard, adopted the Six Sigma methodology to provide a focused approach for achieving quality (Ransom, Joshi, and Nash, 2005). The Six Sigma methodology may be applied to any work activity, however, greatest results are achieve when the process directly affects return on investment and operating income (Harry, 2004).

Dr. Mikel Harry, founder of Motorola's Six Sigma Research Institute, describes Six Sigma as a statistical measurement, business strategy, and philosophy (Harry, 2004). The author further develops this definition by stating that Six Sigma is "a performance target that applies to a single critical to quality characteristic (CTQ), not to the total product" (Harry and Schroeder,

2000) The Greek letter "Sigma," is used in statistics as a symbol for variance. A process that is Four Sigma, indicates an average process; out of a million opportunities for non-conformance, there are 6,200 non-conformities (Harry, 2004). A Six Sigma process reduces the number of opportunities for non-conformance, indicating a world-class process.

The reduction in variance is accomplished through five steps, known as DMAIC, which are Define, Measure, Analyze, Improve, and Control (Ransom, Joshi, & Nash, 2005). The Define phase outlines the purpose of the project and provides a focus that is linked to corporate strategy. Six Sigma projects are initially defined by identifying those areas which impact costs, time, or profit (Wellman, Box, & Saxton, 2003). The Measure phase requires the researcher to gather data and utilize valid metrics to measure performance. The Analyze phase involves scrutinizing the data to determine the root cause of performance deficiencies (Sherman, 2006). The Improve phase is the institution of Six Sigma tools, while solutions to improve the process are developed and regulated in the control phase through monitoring techniques (Ransom, Joshi, and Nash, 2005).

The Six Sigma approach is applicable to all facets of healthcare, both clinical and administrative. Six Sigma projects have been used in hospitals in order to improve "quality, throughput and the bottom line in the operating room" (Pexton, n.d., p.1). Some of these process improvements include improving admissions, optimizing technologies, ensuring appropriate scheduling and improving first case start times. Successful use of the Six Sigma methodology in a hospital setting is exemplified by the Red Cross Hospital in the Netherlands. By implementing Six Sigma across all hierarchical levels, the facility was able to shorten the length of stay of patients with chronic obstructive pulmonary disease, reduce the number of patients on intravenous antibiotics, and reduce error in invoices (Van den Heuvel, Does, and Bisgaard,

2005). When applied correctly, Six Sigma can effectively be used to reduce variation and inefficiencies related to waiting, unnecessary delays, and defects.

Lean Thinking

Lean thinking, also known as lean manufacturing or lean production system, focuses on the removal of "muda," the Japanese term for waste. Waste is defined as "anything not necessary to produce the product or service" (Ransom, Joshi, and Nash, 2005, p.71). James Womack, president and founder of the Lean Enterprise Institute, credits Henry Ford, Kiichiro Toyoda and Taichi Ohno for first implementing lean principles (Womack, n.d.).

The goals of lean manufacturing are to produce products of the highest quality, while lowering manufacturing costs and lead times, through worker safety and environmental responsibility, quality, productivity, and cost. These goals can be operationalized in a hospital environment through Lean Operating philosophies. The operating philosophies are to "make only what is needed; never make a defect, never pass a defect on; eliminate all waste; and focus on cycle-time reduction and flow (Defense Acquisition University [DAU], n.d.)."

The lean philosophy incorporates numerous tools to accomplish the goals of lean thinking. One of the most important tools is the Value stream map, which enables project teams to identify and categorize steps in a process into those that add value, those that have no value and those which are wasteful. Pull systems, also known as Kanban, should be adopted within the value stream. A pull system keeps work in progress below a maximum level in order to reduce lead times (George, 2002). Additionally, the 5S method: sort, set in order, shine, standardize and sustain, prevents breakdowns within the system and will enhance flow (George, 2002).

Several hospitals have developed process improvement projects incorporating lean thinking. One study utilized lean tools such as a Value stream map and the 5S's within an

endoscopic department. The team was able to successfully identify areas to eliminate waste, reduce supply inventory and reduce overall cycle time for patients receiving an uncomplicated colonoscopy (Laing & Baumgartner, 2005). Lean thinking has also been used in maternity care, where the amount of movement made by the mother and child within the health care facility has been reduced (Young, et.al., 2004). By effectively applying lean principles, hospitals can reduce waste and improve flow.

Lean Six Sigma

George indicates the necessity of combining both Lean and Six Sigma. "The fusion of Lean and Six Sigma is required because[:] Lean cannot bring a process under statistical control. Six Sigma alone cannot dramatically improve process speed or reduce investment capital" (2002, p. xii). Therefore, Six Sigma can be considered a subset of lean.

A Lean Six Sigma organization should incorporate three tenets from each philosophy. The tenets from Lean Management include: adopting a philosophy that maximizes steps which provide added value in all operations, continuously evaluating incentive systems to globally optimize systems and empowering management to evaluate all decisions based upon the customer (Arnheiter and Maleyeff, 2005). Additionally, a Lean Six Sigma organization would adopt the following primary tenets from Six Sigma, which include stressing data driven decision-making methodologies, promoting quality by minimizing variation and conducting education and training on an organizational level to improve processes (Arnheiter and Maleyeff, 2005).

The Lean Six Sigma philosophy combines Six Sigma and Lean tools to improve processes. The DMAIC philosophy of Six Sigma is the methodology used to structure process improvement. The Define phase highlights areas of greatest opportunity and links the project's contribution to the Six Sigma philosophy of overall return on investment. Lean tools, such as the

Value stream map, are incorporated in this phase to highlight process flow (Schmidt, Kiemele, & Berdine, 1996). The Measure phase involves an establishment of baselines, process observation, and detailed data collection. Complex processes can be simplified utilizing the Lean Six Sigma tool of a Complexity Value stream map (George, 2003). The Analyze phase involves utilizing data in order to confirm the source of variation and quality deficiencies. Tools such as a cause and effect diagram and the Failure Mode and Effect Analysis are used to determine the root cause of delay and variation (Adams, Kiemele, Pollock, & Quan, 2003). During the improve phase, tools are proposed and identified to serve as prospective solutions, while the control phase involves preserving implemented changes to realize further gains(George, 2003).

Lean Six Sigma is widely becoming an accepted form of process improvement across the military. Initially adopted by manufacturers, the Department of Defense has recognized the applicability of Lean Six Sigma in the area of systems production and acquisitions. In fact, the Deputy Chief of Staff for Operations of the Army Materiel Command has adopted a Lean Six Sigma office to develop and propose strategies as well as facilitate, consult and train others concerning continuous process improvement (Army Materiel Command Operations, 2004). The Army Medical Department (AMEDD) has also developed a Lean Six Sigma Office, and is formulating a plan for familiarizing and educating AMEDD soldiers about Lean Six Sigma processes (G. Randolph, personal communication, November 30, 2005).

In civilian healthcare, Lean Six Sigma techniques were applied at the University of Iowa Hospital and Clinics in the area of Radiology CT scanning. Improvements made in the process resulted in and estimated $750,000 of increased revenue per year (Bahensky, Roe, and Bolton, 2005). Bay Medical Center in Panama City, Florida achieved similar success by utilizing a Lean Six Sigma philosophy to focus upon leadership and staff development. By empowering staff

members to make changes within their respective areas, MRI cancellations were reduced by 6 % and CT cancellations were reduced by 10% (Sherman, 2006). CHRISTUS Spohn Hospital in Corpus Christi saw results in the Emergency Department after just one week of Lean Six Sigma implementation. By constructing a Value stream map to visually depict the patient encounter process, improvements were made to reduce a significant amount of wasteful motion (Sherman, 2006). The combination of Six Sigma and Lean principles is a powerful method of improving various aspects of healthcare.

Purpose

Lean Six Sigma has been used to improve a wide variety of processes. The purpose of this study is to apply the process improvement methodology of Lean Six Sigma to analyze potential factors of low operating room utilization according to surgical service and provide recommendations for achieving RVU and RWP goals.

Method and Procedures

The Six Sigma DMAIC approach was utilized to conduct this case study. The scope of this project captures the surgical process from the moment a patient is informed of a surgical requirement to the moment the patient leaves the facility following surgery. Appointments leading up to the surgery and post–operative appointments do not directly relate to operating room utilization and are beyond the scope of this study.

Define

Three essential components of the define process include a description of the need to improve, the potential return on investment (in terms of capital, quality, and customer satisfaction), and a description of the current system or process. Since a detailed description of the requirement for improvement was addressed in the statement of the problem, the following

paragraphs will be devoted to a discussion of the return on investment and a description of the process.

Return on investment

According to George (2002), the Lean Six Sigma process begins "by identifying value streams with the highest potential increase in shareholder value per investment of resource." A study by the Health Care Advisory board and the Healthcare Financial Management Association (HFMA) indicated that by increasing the performance of the Operating Room of an average-size organization by one procedure per day could result in an increase of 4-7 million dollars in revenue (Pexton, n.d.). At BJACH, increasing operating room throughput provides a twofold reason as the greatest return on investment capital. By meeting the requirements of operating room jump start funding, it will ensure the receipt of $681,000.00 dollars in FY 07. An increase in the number of RVUs and RWPs generated by the Operating Room will also result in an average estimated cost savings of $75.14 per RVU and $3,334.97 per RWP by recapturing purchased care workload, as indicated in Appendices E and F.

Another aspect of value stream identification consists of identifying critical-to-quality issues. These issues "...offer the greatest opportunity for improvement in cost, quality, capital and lead time" (George, 2002, p. 4). In healthcare, the Institute of Medicine (2001) defines quality as safe, effective, efficient, timely, patient centered, and equitable. BJACH captures the voice of the customer in order to improve quality by providing comment cards to each patient in the Same Day Surgery clinic (see Appendix C). These comments are given to the Patient Representatives who consolidate the information and enter it into a database and send the information to the Command for review. Patient assistance and complaint records were gathered from patient representatives from July 2004-July 2005. Of the questions provided in the survey,

the area that the lowest average rating was timeliness of service. Although timeliness of service was still considered "excellent," it highlights as area for further examination (see Appendix D).

Description of the process

A Value stream map is a Lean Six Sigma tool that captures the current state of activities in a process utilizing a flow chart format (see Appendix E). Steps within the process are identified as Customer Value Adding (CVA), Business Value Adding (BVA), or Non-Value adding (NVA). In a service organization, CVA steps are defined as steps or processes that a customer would be willing to pay to receive. BVA steps are steps that are required in order to make the process run more efficiently or are required for regulatory purposes. NVA steps are considered waste and are comprised of transportation, storing, delaying, or rework (George, 2003. p118). The Value stream map was constructed from the perspective of a patient obtaining general surgery at BJACH. However, subsequent discussion will highlight variation between general surgery and other surgical services.

The surgical process begins when a patient meets the requirement for surgery. The physician will schedule the patient by annotating the date of the surgery on a handwritten matrix, a non-value added step. Patients are assigned a date for surgery based on operating room block times (see Appendix F). Physicians are assigned block time on a monthly basis and are given the latitude to assign the number of surgeries per block time. There is not a function in place which analyzes or mandates the number of surgeries a physician should schedule per block time. The physician enters the appointment into CHCS II, a business value adding step, in order to capture the workload for the visit.

In the event that operating room time is not available within 30 days, Active Duty or TRICARE Prime patients are referred to the network. Beneficiaries that are not enrolled in

TRICARE Prime may be placed on an unofficial waiting list within the clinic, a non-value adding step. Some clinics have sufficient demand for waiting lists, others do not. The manner in which waiting lists are maintained is not standardized. For example, the orthopedic clinic utilizes S3 to track average daily backlog of Active Duty patients. This is a requirement from Great Plains Regional Medical Command due to the shortage of orthopedic surgeons within the Army. Other services, such as Otolaryngology, maintain a handwritten waiting list in a binder located at the clinic.

The handwritten schedule is then transposed into S3, which is the scheduling system for the OR. Some physicians/clerks enter patient appointments into the S3 system right away, whereas others do not enter their schedules into the system until 2 days prior. The variation that occurs during this business value adding step makes it problematic for the OR to schedule the appropriate number of support staff.

Once the patient is informed of a prospective surgical date, the patient is told to schedule a pre-op discussion with Same Day Surgery, a business value adding step. Sometimes the patient is able to schedule this appointment before leaving the facility, whereas other times the patient is instructed to call the Same Day Surgery clinic. The pre-op discussion typically lasts 30 minutes per patient, and includes briefings by nursing staff and anesthetist. Based upon the type of surgery required, the patient may also be required to conduct lab work or x-rays, which are located on different floors. Before the patient leaves the hospital, the nursing staff reminds the patient of the date of surgery, but does not provide the patient an arrival time. Instead, patients are instructed to call the Same Day Surgery clinic between 1300-1500 one day prior to the date of surgery. If the patient fails to call, Same Day surgery staff must look up phone numbers and call patients to ensure that the patient remembers the appointment. This non-value adding step

gives the surgical staff the flexibility to adjust the surgical schedule, in the event another procedure must be added to the schedule.

Patients are scheduled to arrive for Same Day Surgery based upon the guidance of the head nurse in the Same Day Surgery clinic. Same Day Surgery is informed of the surgical schedule one day in advance; a hard copy of the schedule is delivered to the SDS clinic by the secretary of the Operating Room. This is a non-value adding step, since the schedule is available on line. The head nurse in SDS typically has 2 patients per operating room arrive at 0630 for a 0730 start time, in case one of the patients ate breakfast. This technique assures that the operating room will start on schedule. Other patients are assigned arrival times, ranging from 30 minutes to one hour intervals. Patients are placed in individual private rooms, vital signs are taken and the patient changes clothes in preparation for surgery; a customer value added step.

Aside from the 0730 start time, there are no other "hard times" for surgeries. The staff in the Operating Room receives a schedule which indicates the order that the patients will be seen and the operating room that will be used. Although operating rooms are available from 0730-1430, Monday through Friday, it is rare that the entire time is used, unless cases are "added on" to the schedule at the last minute. However, the operating room must also be prepared to receive emergency surgeries, such as appendectomies and C-sections after 1430.

When the Operating Room is prepared to receive a patient, an Operating Room tech will go to Same Day Surgery and perform the non-value adding step of bringing the patient to the holding area (located outside of the OR). This is indicative of a pull mechanism. The patient will be briefed by an OR nurse and the anesthesiologist. Required paperwork will be completed and the patient will let the staff know what type of surgery will be performed for quality control purposes. The patient will then be transferred into the operating room for surgery.

Procedures are performed in one of six Operating Rooms which are equipped and scheduled according to function. See table 2. Due to equipment constraints, Laparoscopic surgery and other Orthopedic surgery can only be done in Room 2. Operating Room 4 is dedicated to C-sections, but in the past was used for storage. Operating Room 6 is also used for storage.

Table 1

Operating Room functions

Operating Room	Function
Operating Room 1	General Surgery/Gynecology
Operating Room 2	General Surgery/Orthopedics/Podiatry
Operating Room 3	Ear, Nose, and Throat (ENT)
Operating Room 4	Caesarean Sections/Storage
Operating Room 5	Ophthalmology
Operating Room 6	Storage

Immediately following surgery, an OR tech and one nurse will transport the patient to the PACU, other support staff members will remain in the OR to clean the area. The PACU will receive the patient for Phase I post-anesthesia recovery, a customer value added step. The PACU is staffed for 2 shifts; 0700-1530 and 0830-1700. If a patient leaves surgery after 1700, Phase I post anesthesia recovery is done in the Special Care Unit (SCU). Once patients meet the requirements for phase II observation, they are transferred to Same Day Surgery by a tech from the PACU, a non-value adding step.

At this point in the process, depending upon the number of surgeries scheduled, the Same Day Surgery clinic could become overwhelmed. The staff will simultaneously be preparing patients for surgeries while accepting patients for post-op phase II observation. There are only four patient rooms and one pre-op room within the same day surgery clinic. If a room is not available, post operative patients are placed in SCU, which is adjacent to the Same Day Surgery clinic. The nurses may also ask pre-operative patients to wait in the SDS waiting area until a room is available.

Once the patients have met the requirements for phase II post-operative surgery, they are escorted out of the building by Same Day Surgery staff. This assistance is done to protect the facility from the possibility that a patient injures themselves while on hospital grounds. Nurses in SDS enter appointment information into the system at the end of the shift, to ensure accuracy of clinical times, a business value added step.

It is apparent by looking at the steps in the Value stream map that the majority of steps are NVA due to waiting or transportation. The greatest opportunity for improving operating room utilization is to reduce the amount of wait time between informing a patient of the surgical requirement and the date of pre-op discussion, because of the amount of variation in the process. One patient may be sent to surgery immediately, whereas another patient may not be scheduled for an elective procedure for over 30 days. By ensuring that a patient is scheduled for surgery as soon as possible, operating room utilization is increased and the amount of work-in-process is reduced.

Measure

The Measure phase involves identifying performance measures and establishing baselines of performance by surgical service. BJACH provides a variety of surgical services, to include general surgery, oral surgery, orthopedics, obstetrics, gynecology, podiatry, ophthalmology, and otolaryngology.

Performance measures

Surgical service performance is measured in terms of actual RVUs and RWPs and compared to projected RVU and RWP levels along with staffing levels. This information is presented in the Review and Analysis Meeting to the Commander on a Quarterly basis. However, this performance measure not only includes surgeries, but also includes clinic visits and follow-up appointments. Therefore a routine examination of actual surgical performance in terms of RVUs and RWPs is not conducted.

Additionally, operating room performance is not being measured in terms of utilization. It is generally accepted that surgeons seek opportunities to perform surgeries. Although the head nurse monitors the schedule to ensure that an appropriate amount of time is allocated per service, data is not routinely collected to determine if the time allocated is utilized to the fullest extent.

Baselines of performance

To determine an appropriate baseline of performance, historical data were collected from July 1, 2004 through July 31, 2005 utilizing M2 data repository and the Surgery Scheduling System (S3). The M2 data repository is the source of direct care and purchased care RVUs and RWPs, total claims, and surgical service line identification. The M2 data repository contains a subset of data from Military Health System (MHS) operational systems such as the Composite Healthcare System (CHCS), Defense Enrollment Eligibility System (DEERS), Expense

Assignment System (EAS) and the TRICARE Management Activity Aurora Claims Acceptance System. M2 is the primary source of historical data for the MHS. Reliability and validity of M2 data is dependent upon several factors, which include accuracy of coding and completeness of data entry. The accuracy of coding at the facility level may vary based upon the experience level and meticulousness of the individual coding the encounter. However, MTFs are required to perform random record audits to increase reliability and ensure that upcoding and undercoding does not occur. Accounting data accuracy is based upon completeness of data entry. For example, purchased care accounting data may not be available within the month that the expense was incurred, due to the time required to receive the bill and process the information. Typically claims data is available 45 days after the month that the service was performed. To increase validity, selected data were greater than 45 days old.

The S3 system is used to schedule operating rooms and maintains information regarding the amount of time required for a procedure by provider, surgery start times and types of procedures performed. It was first developed by an engineer at Tripler Army Medical Center, then adopted by the Army Medical Department in 2002 to improve the surgery scheduling management process. The system allows clinics and surgeons to book surgeries and improved over and under booking of surgeries (Surgery Scheduling System a Success, 2005). S3 is the source of minutes of service by procedure and service line. The data were examined to determine reliability and validity. Similar to the M2 data mart, the content validity of S3 data is based upon the accuracy of data entry into the system.

Both of these systems were used to determine the baseline amount of surgical care by service provided at BJACH for a 13 month period. According to the M2 data mart, the primary data repository for the Army Medical Department, operating room procedures accounted for 533

of the 3193 inpatient admissions at BJACH between July 1, 2004 and July 31, 2005. Obstetrics and General Surgery procedures comprised the majority of the admissions. Summary statistics by surgical service for Active Duty and TRICARE Prime patients are located in Appendix G. From July 1, 2004 to July 31, 2005, BJACH performed 538,921 direct care outpatient encounters. Surgical procedures encompassed 2,480 of these encounters. High volume procedures for Active Duty and TRICARE Prime members were accomplished by the General Surgery, Orthopedic, and Otorhinolaryngology Clinics. Mean direct care and purchased care RVUs and RWPs are depicted in Table 2.

Table 2

Descriptive Statistics of Surgical-related Admissions and Encounters for Active duty and TRICARE Prime enrollees not associated with an emergency room visit

	Direct Care			Purchased Care		
	M	SD	n	M	SD	n
Relative Weighted Product	1.18	0.73	533	1.79	2.11	421
Relative Value Unit	6.17	3.67	2480	3.94	8.14	4830

Note. 1 July 2004 to 31 July 2005.

Another aspect of the performance baseline is to determine whether there is sufficient demand for additional surgeries. BJACH employs strict procedures to control the number and type of encounters which are sent to other facilities. All consults and referrals are reviewed by a Registered Nurse in the Clinical Support Division for approval. The 10 facilities receiving the most surgical consults or referrals are indicated in Appendix H. Every effort is made to ensure that Active Duty and TRICARE Prime enrollees are seen at BJACH. During the time period of July 1, 2004 – July 31, 2005, Active Duty and TRICARE Prime enrollees accounted for 1082 inpatient, purchased care, individual claims. Four hundred and sixteen admissions were not

related to the Emergency Department, yet had a procedure associated with the claim. The average total dollar amount per RWP for an Active Duty or TRICARE Prime enrollee during this period was $3,233.71 (see Appendix I).

Between July 2004 and July 2005, Active Duty and TRICARE Prime enrollees accounted for 174,199 billed, purchased care, outpatient, individual claims. Excluding emergency room visits, 4830 services were related to surgery. The average cost per RVU for an Active Duty or TRICARE Prime enrollee was $75.15. Based upon the number of procedures that are sent to the network, there would be sufficient outpatient workload available to sustain operations if another room were utilized or throughput were increased (see Appendix J).

Based upon purchased care and direct care data, it can be inferred that operating room utilization is affected in the following manner. The majority of high value purchased care inpatient RWPs can be attributed to services that are not offered at BJACH. Of the services offered at BJACH the mean RWP per service ranges from 0.68-1.67. In terms of volume, Orthopedic/Podiatry, Obstetrics, and Gynecology, respectively, account for the majority of inpatient purchase care admissions, yet do not account for the majority of claims dollars. In fact, services that are provide at BJACH account for the five lowest amounts of claims paid to the TRICARE network. Since women enrolled in TRICARE are provided the option to choose a hospital for childbirth, the best services to maximize operating room time in terms of RWPs would be Orthopedics.

From a business standpoint, in terms of RVUs, it would be beneficial to maximize the schedules of General Surgery, Ophthalmology, and Orthopedics. Purchased care outpatient general surgery had the highest mean RVUs and had the highest claims associated with the encounter. However, this service accomplished the second highest number of outpatient

procedures. Interestingly, direct care general surgery received the second lowest mean RVU of the BJACH surgical services. Further research is required to determine if these general surgery procedures were referred to the network based upon complexity. Ophthalmology had the second highest mean RVU and the fourth highest amount of claims associated with the procedure. Scheduling this service more frequently would be beneficial in order to gain a high number of RVUs per procedure. Purchased care orthopedics also had a high mean RVU, with total claims being the third highest. However, of the seven surgical services at BJACH Direct care outpatient Orthopedics accomplished the most procedures and gained the highest mean RVUs and there may not be enough capacity to recapture more orthopedic procedures.

Aside from RVUs and RWPs, a performance baseline was established in the area of utilization. To date, neither the Department of Defense nor the Army Medical Department has determined a target utilization rate for operating rooms at military Medical Treatment Facilities. There have been few multi-hospital studies of operating room utilization as well. This can be attributed to the fact that many hospital systems use consultants to measure utilization and the findings are not published. Additionally, consultants vary in their definitions and measurement of utilization. Some consultants include turnover time as a part of utilization, whereas other measure utilization from the time the patient enters the operating room until the patient leaves the room. Another difference amongst consultants includes the definition of available operating room time. Some consultants use 7 or 7.5 hours, instead of a full 8 hour shift to measure utilization to compensate for turnover time, others use elective hours of operation (Patterson, 1997). The majority of the consultants use 80% as a general target for utilization. "Experts agree that 80% to 85% is the maximum utilization that an OR can be expected to reach. Over that

percentage, the department loses flexibility and needs to consider adding capacity"(Patterson, 1997, p.2).

Utilization is related to scheduling in terms of available operating room time. Typically, there are three types of scheduling. Block time is a method of scheduling operating room times by assigning a block of time per week to one specific surgical service. Block times are used to standardize staffing and equipment and are beneficial because they allow providers to dedicate full days to clinic appointments and operating room surgeries. However, there is a possibility that time may be unutilized if a service fails to fill the block time and it is not offered to other services for use (Patterson, 1996). Another commonly-used operating room scheduling type is the modified block, where some time is blocked and some is left open. Typically unused block time is released to other surgical services 72 hours in advance. The final scheduling type is open scheduling, where the schedule is open to whomever schedules the room first and modified block. This scheduling process favors those services that have the ability to plan in advance, such as services with elective procedures. During the period of July 1, 2004 – July 31, 2005, BJACH used a combination of block time scheduling and modified block scheduling.

Block times are not always used efficiently by every surgical service line. In a study conducted at a teaching hospital, 58,251 surgical cases and 10 surgical subspecialty blocks over a six year period were analyzed. Surgical subspecialty utilization of block time by day ranged from 44-113%. Average daily overutilization of block times ranged from 4-49% and underutilization ranged from 16 to 60% and the authors concluded that budget implications would be significant (Strum, D., Vargas, L., & May, J., 1999). Block times should be periodically reviewed for utilization. Kaiser Permanente Medical Center in San Francisco reviews OR utilization on a quarterly basis. Services are held to a standard of 70% block time utilization; services failing to

meet this standard receive less block time in the future. Another technique is to continue to provide block time to services with low utilization, but increase the release time to other surgical services from 72 hours to five days (Patterson, 1996). Review and reallocation of block time at BJACH is an informal process that is accomplished by the head nurse.

Surgical schedules were not available for the 13 month period of July 1, 2004 through 31 July 2005. Therefore, it was assumed by the researcher that if one surgical service performed surgeries on a particular day, then that service had one operating room and eight hours of block time available. It two surgical services performed surgeries on one day, it was assumed that two Operating rooms were open and two services had block time for the eight hours period. To obtain a percentage of time utilized, the following technique was used. If only one operating room was scheduled per day, the numerator consisted of actual minutes of service (as defined in Appendix K) and the denominator was 480 minutes. If two or more operating rooms were scheduled per day, the numerator was minutes of service and the denominator was 960 minutes. This reflects the assumption that staffing is only available for two rooms. Although three to four rooms were used on occasion based upon equipment requirements, it is assumed that the surgical service shared block time and aside from the actual surgeon, all other staff members remained the same.

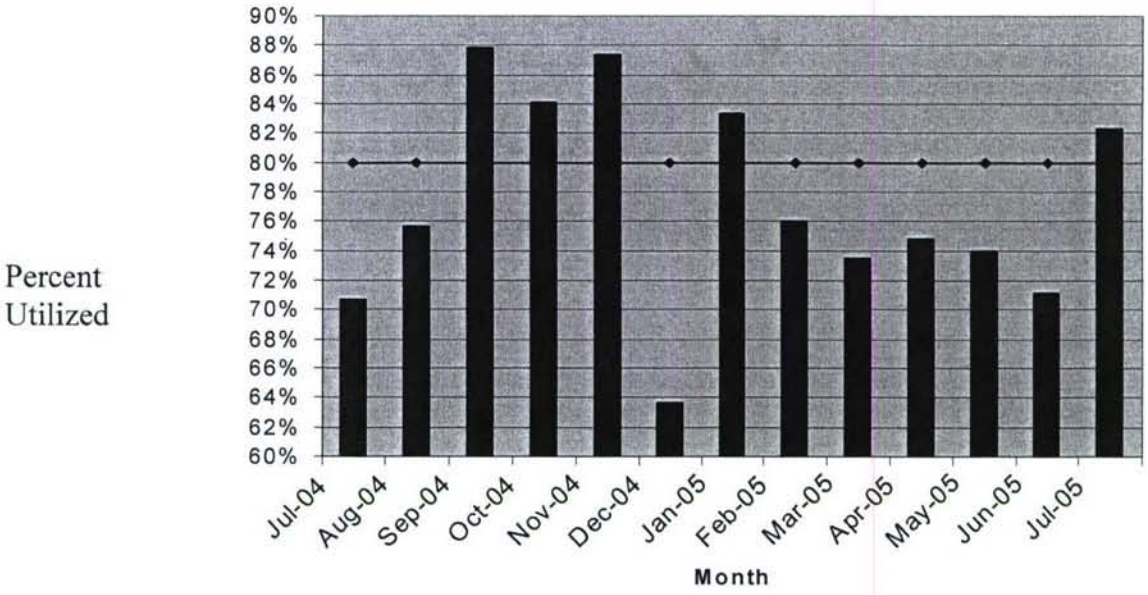


Figure 1. Operating Room Utilization by Month

The average percentage of block time utilization was 77%. The lowest utilization months were December 2004, July 2004, and June 2005. July 2004 had one operating room scheduled for twelve of the nineteen available surgical days in the month, yet still achieved a low utilization rate. In June 2005, eight of the 17 available operating room days had 3 rooms, yet utilization was low.

The months with the highest and lowest utilization, September 2004 and December 2004 respectively, were examined in detail. The number of minutes used were totaled per operating room by scheduled service by day, then converted into a percentage. Minutes that were used but not scheduled were not considered. It was found that General Surgery and Orthopedics typically maximize block times.

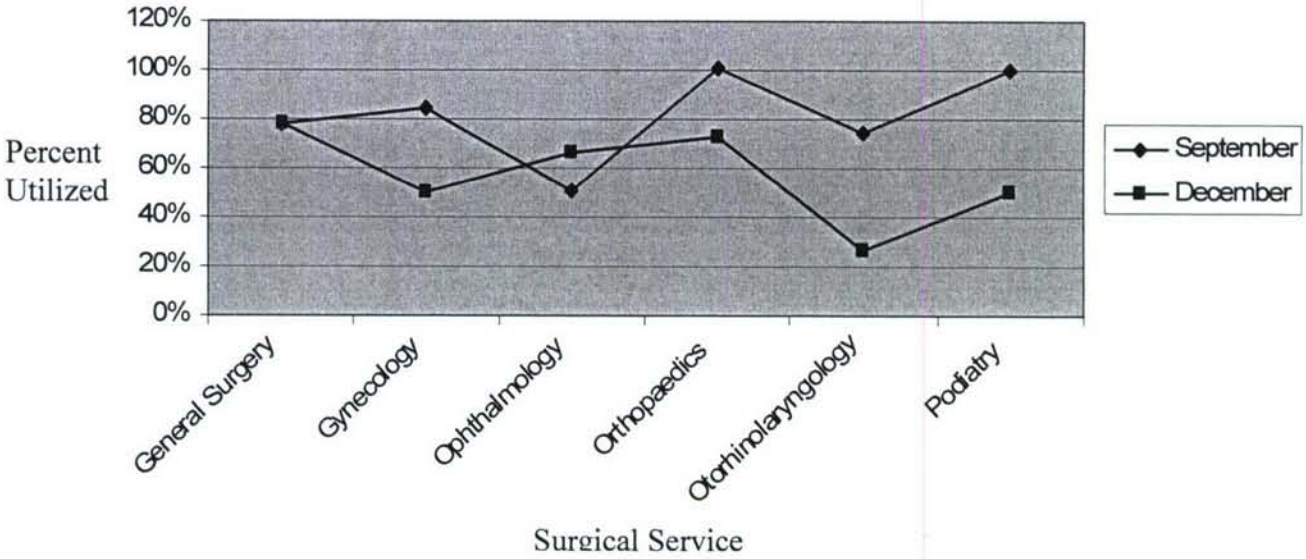


Figure 2. Operating Room Utilization by Service

General surgery is the service that consistently achieved the 80% utilization rate during September and December 2004. In December, General Surgery was scheduled for half of the amount of time that it received in September and subsequently used unscheduled minutes and was the only service to utilize an open period (see table 3). Orthopedics also came close to consistently achieving an 80% utilization rate. It had the highest number of operating room time scheduled and requested a large amount of additional time during both months.

Ophthalmology consistently underutilized scheduled operating room time and was only scheduled for approximately 2 operating rooms per month. Utilization of operating room time by this service could be increased.

Gynecology exceeded the 80% utilization rate during the month of September. However in December fell to 50% utilization. Gynecology had the same amount of operating room time scheduled each month, yet requested additional unscheduled time during both months. This requires further investigation. Operating room utilization by otolaryngology and podiatry was

not consistent during both months. Both services were scheduled for relatively few operating room periods; otolaryngology did not use all of the time allocated in December, yet used 263 additional minutes. The amount of operating room periods increased in December and podiatry was unable to utilize the additional periods.

Table 3

Minutes used by Surgical service

	Scheduled periods		Minutes of open time used		Unscheduled minutes used	
Surgical Service	September	December	September	December	September	December
General Surgery	12	5.5	0	110	275	1066
Gynecology	3	3	0	0	392	160
Opthalmology	2	1.5	0	0	0	0
Oral surgery	0	1	0	0	0	273
Orthopedics	15	11	0	0	903	864
Otorhinolaryngology	4	4.5	0	0	0	263
Podiatry	1	3	0	0	136	0
Open	1	0.5	0	0	N/A	N/A
Total	38	30	0	110	1706	2626

Note. A scheduled period consists of 480 minutes.

Another method of analyzing utilization involved examining the number of minutes used according to the number of operating rooms scheduled. Weekends and holidays were excluded. N represents the number of days between July 1, 2004 and July 31, 2005 that a certain number of operating rooms were scheduled. The mean reflects the mean number of minutes used when a certain number of operating rooms were scheduled. The more rooms scheduled, the lower the utilization rate. This can be attributed to add-ons and sharing of staff members.

Table 4

Descriptive Statistics of minutes used by number of operating rooms scheduled

Number of Operating Rooms	n	Mean	Min	Max	S.D.
1	53	343.70	40	641	174.94
2	165	709.84	235	1235	218.89
3	39	887.13	422	1306	210.20
4	3	1048.33	968	1105	71.50

Note. July 1 2004 - July 31, 2005

Analyze

The next step in the DMAIC process is to analyze data. The analyze phase describes the process improvement variables and the potential cost savings or avoidance. To identify and describe these variables and to discover possible explanations for low utilization, a cause and effect diagram was constructed. The desired effect (output) is to maximize throughput by increasing operating room utilization. Potential causes (variables) are identified as constants, noise, or experimental and are categorized as relating to material, manpower, machine, methods, measurement, or environment. Variables that are identified as constants are held as constant as possible through the use of standard operating procedures. Noise variables affect the process but may not be controlled based upon cost of difficulty. The final type of variable is experimental. These are the variables that have the greatest potential for return on investment and will be analyzed during this study.

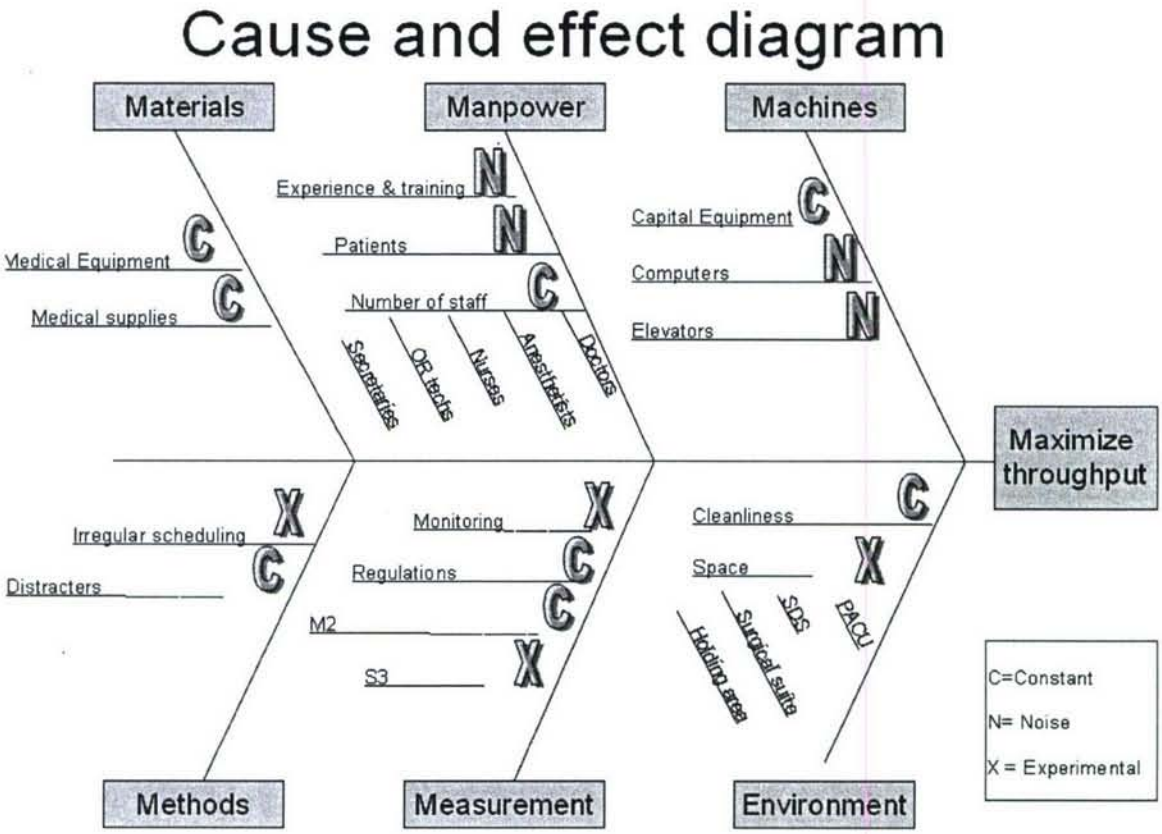


Figure 3. Cause and effect diagram of the surgical scheduling process

Materials

Surgeries can potentially not be performed because of a lack of clean and functional medical equipment. For example, items such as scalpels and scopes must be sterilized prior to each surgery. Complex equipment such as an anesthesia machine must be calibrated and inspected on a regular basis. These processes are controlled through the use of a Standard Operating Procedure (SOP) in the logistics section of the hospital.

Medical supplies are required to accomplish multiple types of surgeries. Supplies such as intravenous fluid and anesthetics must be readily available and used prior to the expiration date.

This process is also controlled through the use of SOPs and Defense Medical Logistics Standard Support (DMLSS) computer system.

Manpower

Manpower can restrict the number of surgeries performed as well. Individual members of the staff do not have the same amount of experience or training. Some of the staff has had in-depth training by attending courses related to their specialty, whereas others may have just completed initial training. Therefore it may take longer for certain individuals to accomplish their particular task within the surgical process than another staff member of the same specialty. Experience levels are monitored through privileging and credentialing. Providers that do not possess the required expertise will not be granted privileges to practice certain procedures. Providers will also request assistance from other providers in the event that a procedure is too complex. Although the process is somewhat controlled by ensuring that all surgical staff have received initial training and have received an orientation of the facility, experience and training are considered noise because not all members of the staff within the same specialty can perform their tasks with the same level of speed and accuracy.

The number of patients requiring surgery is an important variable that is difficult to control and therefore is considered noise. The types of patient may differ greatly. An elderly patient requiring surgery that also has multiple ailments is more complex and requires more time than an otherwise healthy patient. The types of surgery also vary greatly. Several patients may experience the same ailment, causing an increased requirement of one procedure or service line. An example of this is the orthopedic service line, which has a backlog. Other product lines, such as oral surgery, do not have enough patients to fill the schedule. Patient flow and types can not

easily be controlled. The surgical staff abides by strict ethical standards to provide only the treatment that is required.

The number of available staff affects throughput as well. Staffing varies based upon availability of personnel. Providers and staff may require sick leave, time off, and must complete other Army training requirements during the duty day. Providers may be unavailable for an extended period of time due to deployments. Staffing varies according to the type of surgery as well. A deficit of a certain type of staff member (for example, if the one assigned podiatrist is deployed) may be detrimental to the entire process and could potentially affect whether a certain type of procedure is performed.

Staffing within the facility will change dramatically in January 2006. There are a total of seven National Guard and Reserve units that are currently providing backfill support for soldiers who were deployed with the 115th Field Hospital. The majority of the backfill positions are filled by soldiers from the 4010th U.S. Army Hospital (USAH). Additional soldiers from the 4010th USAH requested mobilization to Active Duty and are filling other authorized or overstrength positions within BJACH, for a total of 94 mobilized reservists. The 115th Field Hospital recently returned from their mission in support of Operation Iraqi Freedom and added eleven personnel to BJACH staffing. Since BJACH has operated with excess personnel for over a year, responsibilities and workload in various areas of the hospital must be reassigned. The 4010th USAH is scheduled to demobilize in February 2006, affecting 6 members of the Operating Room (OR) staff, predominantly nurses and NCOs. Additionally, the head nurse of the OR is part of the 3297 USAH, which is scheduled to demobilize in April of 2006. Current authorizations and filled positions for OR staff and support staff according to the Tale of Distribution and Allowances (TDA) are located in Appendix L. Replacements are in the process

of being requested for authorized positions in the OR, however, it is not known if replacements will arrive in time to facilitate opening another operating room.

Staff members perform a disproportionate amount of work. Same Day Surgery staff often work late due to backlog within the system. Sometimes PACU nurses assist Same Day Surgery staff, but this is not a standard operating procedure. Staffing is considered a controlled variable because the head nurse adjusts the operating room schedule to compensate for lack of available surgical staff. Physicians also control staffing in their particular office areas. BJACH utilizes a strict procedure to hire additional civilian staffing. A MEDCOM process is in place to request additional personnel, if justified.

Machines

Capital Equipment is expensive and considered to be maintenance significant. Every operating room does not contain the same Capital Equipment. Therefore a service line like orthopedics may be restricted to operate in a certain room based on availability of capital equipment, such as an orthopedic tower. Based upon available funding, this variable is remains constant.

There are several computer systems utilized to schedule and track surgical requirements and are considered noise. These systems include S3, CHCS I and CHCS II. Barriers to effective computer utilization include system maintenance, numerous security and password requirements, slow systems, multiple screens, and requirements for multiple applications to be utilized on one system. Additionally, the hospital is transitioning to a paperless system. During this transition period, only certain forms are automated and some computer applications require redundant information. As a result, the utilization of computer systems varies among staff members. Some staff members are reluctant to use computer applications and employ techniques to circumvent

the systems. For example, some providers handwrite scheduling information into a book rather than entering the information directly into the S3 system. This causes unnecessary delays and prevents the sharing of scheduling information.

Elevators are a key method of transportation of both patients and supplies. For several months, certain elevators have not been functioning properly. This causes the OR techs to travel over longer distances and must wait longer due to transportation. Elevator repair and operation is controlled with a SOP through the logistics division. The Chief of Logistics has relieved the current contractor for not adhering to maintenance contract requirements. The new contractor is expected to perform the required maintenance in a timely manner.

Methods

The operating room schedule is developed based upon the staff members that are available. Operating rooms are assigned by the head nurse of the operating room on a monthly basis according to block times by surgical service. Each surgical service is required to provide the head nurse with a memorandum on a monthly basis describing unavailable days due to leave etc. Block times for the operating room are from 0730-1430, Monday through Friday. Typically two operating rooms are scheduled per day. Surgical services that have higher demand, such as orthopedics and general surgery, receive more operating room time per month than other services such as otolaryngology and ophthalmology. Communication between the surgical service lines and the head nurse is paramount in order to ensure that enough operating room time is allocated per month. If it appears that there may not be a demand for a particular service, there is not a standard operating procedure that will shift that time to another service. Surgical services with a high amount of backlog will frequently request to utilize block time allocated to services that historically fail to utilize allocated block time.

There are always events which take place in and around the hospital which detract and conflict with the surgical schedule. Army training requirements, mandatory meetings, and temporary duty requirements are not predictable. Other areas of the hospital need to be cognizant to offer training events at multiple times so that the people involved with surgery can participate.

Measurement

The facility has not established metrics to monitor the number of surgeries flowing through the operating room by service by month. It is generally accepted that surgeons enjoy performing surgeries and usually must be restricted from over use of block time. However, without a mechanism to gauge the expected number of surgeries, or utilization, there is not a way to know whether the facility will meet RVU requirements.

There are many Army regulations, MEDCOM guidance, and JCAHO requirements which cause a large amount of paperwork to be generated for each patient. Some paperwork may be completed in an electronic format; others must be completed by hand. The complexity of the paperwork was noted by the pre-JCAHO surveyors as a hindrance to productivity. Measures have been taken to reduce repetition amongst all of the forms. However, the format of some of the paperwork can not be changed at the local level, since it is mandated by MEDCOM.

The M2 system provides valuable workload data and is considered a constant variable because the system limitations can not be changed and because the practice of targeting high-RVU procedures to meet workload goals, instead of performing a procedure due to medical necessity is considered unethical. Numerous variables are taken into account when assigning RVU values. Therefore, it is difficult for providers to measure performance because procedures are not easily translated to RVUs. Exact RVU values are not known when a surgery is scheduled

and accurate data are not available until one to three months after a surgery is completed due to a lag in the M2 system. To increase visibility of workload, a Review and Analysis meeting is held on a quarterly basis to ensure that RVU and RWP targets are met. The Commander recently initiated a policy to have surgical services brief workload data to increase provider awareness and incorporate M2 data into daily processes.

The S3 system provides all surgical services with scheduling data. This is considered an experimental variable because the tool is not used in the manner that it was designed. For example, some surgical services do not enter scheduling information into the system until one or two days before the surgery is conducted. Therefore other surgical services do not know if block time of another service will be completely utilized ahead of time. S3 also provides information regarding how long a provider is expected to take performing a particular surgery, based upon past history. This mechanism should allow providers to completely utilize their block of time.

Environment

The final category in the cause and effect analysis is the environment. Cleanliness in the surgical suite is imperative in order to prevent infection. Currently, the OR techs and nursing staff clean in between surgical procedures, and housekeeping cleans at the end of the day. This allows for quick room turn around time. This system is controlled through a SOP.

The amount of space available for patient care affects throughput. It is considered to be experimental for several reasons. Space requirements limit an increase in throughput because of the lack of available beds in the Same Day Surgery area. The Same Day Surgery area has only 5 rooms available for phase II recovery and becomes overwhelmed when surgical service lines fully utilize available block time and perform multiple procedures. The current solution is to hold a patient in the PACU (phase I) for an extended period of time. Phase II recovery begins when

the patient enters the Same Day Surgery area and the time is not adjusted to compensate for the extended time spent in phase I recovery. This causes backlog in the Same Day Surgery area.

Additionally, all patients undergo Phase I and Phase II recovery even though the amount of time that patient spends in Phase I recovery can be reduced, based on the type of anesthesia that is administered.

There is capacity in the operating room area to open more operating rooms. Of the six operating rooms available, only four are being used. The PACU is also underutilized; there is a large open bay area, yet only one side of the room is utilized for phase I recovery.

The Labor and Delivery renovation project is nearing completion and according to the 5-year plan, the Emergency Department will be the next area of the facility to undergo construction (see Appendix M). The Emergency Department is located on the second floor, along with the bulk of patient services to include family practice, pharmacy, laboratory, pathology, outpatient records, radiology, pediatrics, internal medicine, allergy clinic, orthopedics, podiatry and most importantly the operating rooms, Post-Anesthesia Care Unit, (PACU), intensive care, general surgery and same day surgery (Bayne-Jones Army Community Hospital, n.d.). The Emergency Department is adjacent to same day surgery and radiology (see Appendix N). Although the current 5 year plan calls for the Emergency Department to be relocated to another location on the second floor, the Commander has expressed interest in adjusting this location. The flow of patients through the surgical process could be disrupted based upon a potential relocation of the Emergency Department and could significantly impact the duration of a surgical visit.

All in all, the cause and effect diagram highlights four experimental variables which can be influenced by process changes at BJACH: irregular scheduling, use of S3, monitoring and space. It also shows four noise variables which will not be controlled due to cost and difficulty

and eight constants that are outside of BJACH's span of control or are controlled by standard operating procedures.

Improve

The Improve phase addresses the key variables that impact performance measurement, proposes process changes, and highlights the potential impact upon customers.

Key factors for low utilization

The Cause and effect analysis highlighted two main areas for change that BJACH has the capacity to influence. BJACH could improve the use of the S3 system to better monitor utilization and assist with scheduling. Also space utilization in the Same Day Surgery and PACU could be improved.

Proposed process changes

A formalized target of 80% utilization per month should be established from S3 data to monitor variation in Operating Room utilization. Data should be displayed according to surgical service using a control chart. The number of operating room periods scheduled should also be monitored per month. Justification should be provided if only 480 minutes (one operating room period) per day is scheduled. This function is best performed by the administrative assistant in Same Day Surgery. These control charts should be presented at the monthly peri-operative services meeting.

Establish a formal process to allocate unused block time to other services. This will reduce the amount of wait time between informing a patient of the surgical requirement and the date of pre-op discussion. Require all surgical services to enter scheduling information into S3 at a minimum of one or two weeks in advance to provide scheduling visibility to all surgical

services. If a service fails to achieve 80% utilization within a two month period, time should be reallocated to another surgical service.

Develop a weekly reporting process to centrally manage surgical wait lists by surgical service. This function can also be performed by the by the administrative assistant in Same Day Surgery. This will provide the head nurse with overall visibility of operating room requirements and ensure that the schedule meets the needs of every service.

Implement one of two methods to improve space utilization in the Same Day Surgery and PACU area. One method is to require PACU staff to assist SDS staff after 1430 hours. Patients can be moved from one side of the PACU to the other, symbolizing the change from phase I to phase II. Same Day Surgery Staff can then work on the other side of the PACU after 1430 hours. This would allow BJACH to combine nursing staff and reduce the amount of workload for SDS. PACU technicians can also assist same day surgery nurses with copying forms and data entry into CHCS. Another possible method is to implement the fast-tracking plan developed by the head nurse of the PACU. Patients will be provided the lowest amount of anesthesia necessary. Patients meeting certain discharge criteria would be expedited through phase I and phase II post anesthesia observation. This will improve flow and increase the number of cases that can be accomplished. Additionally, when the patient rooms in Same Day Surgery are utilized, they should be organized according to function so that the PACU staff can immediately move patients into the correct room for phase II observation.

Potential customer impact

It is expected that patient satisfaction will increase, since wait time for a surgical date will decrease. Patient satisfaction may increase because patients are seen within BJACH rather than sent to the network. Some patients may not be pleased with having surgery as soon as possible

because they may need time to adjust to their condition or schedule time off of work in order to have surgery and recover. Patients may also be dissatisfied with recovering in the PACU for phase II instead of in the Same Day Surgery area. Since Same Day surgery has separate rooms for individual patients, privacy is not a concern and family members are allowed to be with the patient. However, in the PACU, family members will not be allowed to enter that area and privacy is limited because of the open-bay room.

Control

The control phase identifies possible barriers to implementation and risk assessment. Barriers include possible resistance to change from department members, the learning curve of actually developing the report to monitor data, and enforcing the standard of ensuring that surgical data is entered into the S3 system in a timely manner. Other possible barriers include ensuring adequate spacing between beds in the PACU to ensure privacy and resistance from staff members to work in both areas of the PACU for phase I and phase II post anesthesia observation.

The control phase also involves the implementation of improvements and monitoring to determine if variation is reduced and quality is achieved. Due to time constraints, this aspect of the control phase is beyond the scope of this study.

Results

The DMAIC approach provided a framework to develop recommendations for improving operating room utilization and achieving RVU and RWP goals. The surgical service with the greatest potential for improving utilization is Ophthalmology. The demand exists as evidenced by the number of patients sent to the network and the return on investment is expected to increase due to a high mean RVU for this service. Operating room utilization by otolaryngology, gynecology, and podiatry was not consistent and further investigation is required to determine

the exact nature of the inconsistencies. However, room for improvement exists with all services. In particular, podiatry had the largest number of cases seen by network providers. Additional data collection and analysis is also required to determine if a third operating room is necessary to attain RVU and RWP goals. Potential candidates for a third operating room, due to large demand and high RVUs/RWPs, include general surgery and orthopedics.

Conclusion

The Lean Six Sigma methodology identified several key areas for improving operating room utilization at BJACH. The Value Stream Map highlighted non-value adding steps, such as the duration of time that a patient waits before actually entering the operating room. Data collected from July 2004- July 2005, provided insight into the average RVU and RWP values attained by service along with utilization trends. Additionally, the cause and effect diagram was instrumental in identifying the variables that can be influenced by internal process changes. By monitoring utilization, controlling variation, adapting the operating room schedule based upon data trends, and adjusting patient flow to maximize available space, it is expected that utilization will increase and Bayne-Jones Army Community Hospital will attain jump start funding goals.

Appendix A. Total Enrollment at Bayne-Jones Army Community Hospital

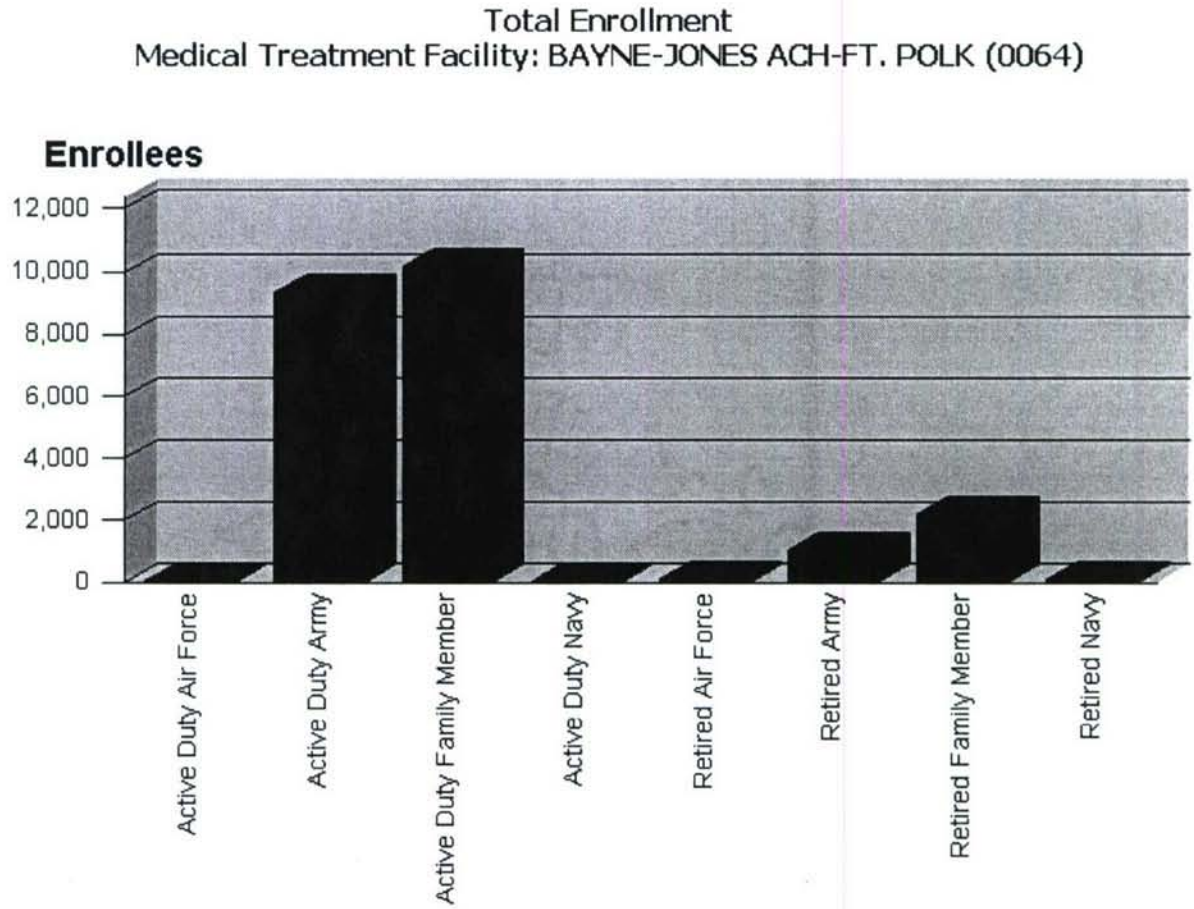


Figure A. Number of Enrollees by beneficiary category at BJACH, July 2005

Appendix B. Jump Start Analysis for Operating Room and OBGYN.

CRNA/Operating Room Jump Start Initiative

SITE: BJACH, Ft. Polk, LA.
POC: Gerald C. Mitchell, C, Management Analysis, RM
Gerald.Mitchell@amedd.army.mil
337.531.3072

Statement of Work and Background: BJACH currently operates only two of its three operating rooms due to staffing issues at the professional level. This has been a consistent policy, not only in FY04, but also FY05. The total number of patients treated in the OR in FY04 was 1,817. In FY05 the total number is 750 until March, and straight lined to the end of the FY at 1,500. BJACH does expect the FY05 forecast to increase due to the re-stationing of the 10th Mountain BDE, re-deploying units and GWOT. We estimate our FY05 population to equal or exceed our FY04 capacity. During FY05 we have been between 40% and 80% strength in terms of our Anesthesia Team (CMS data). We have adequate nursing and surgical staff to facilitate operating an additional room. BJACH is confident that it can open an additional room with the addition of a contract CRNA. By opening another room we would be able to recapture a segment of our dependent and retired population that we have lost to the civilian sector. Additionally we would be able to show an increase in RWPs by admitting more of our client base.

Goals and Objectives: The key factor to increase productivity in Operating Room, and through admissions, is to operate all of BJACH's available surgical rooms. BJACH has lost a substantial client base particularly in its dependent and retired population due to purchased care.

Financial Benefits: I will use FY04 data. By utilizing an additional operating room BJACH would expect to see an increase of over 900 cases annually. Many of these cases would require hospitalization and follow-up care increasing RWPs for this facility. The RWPs increase has a direct relationship to bed days. In FY05 from October to May this facility accumulated 1,036 bed days. Straight lined through the rest of the FY will total 1,554 bed days.

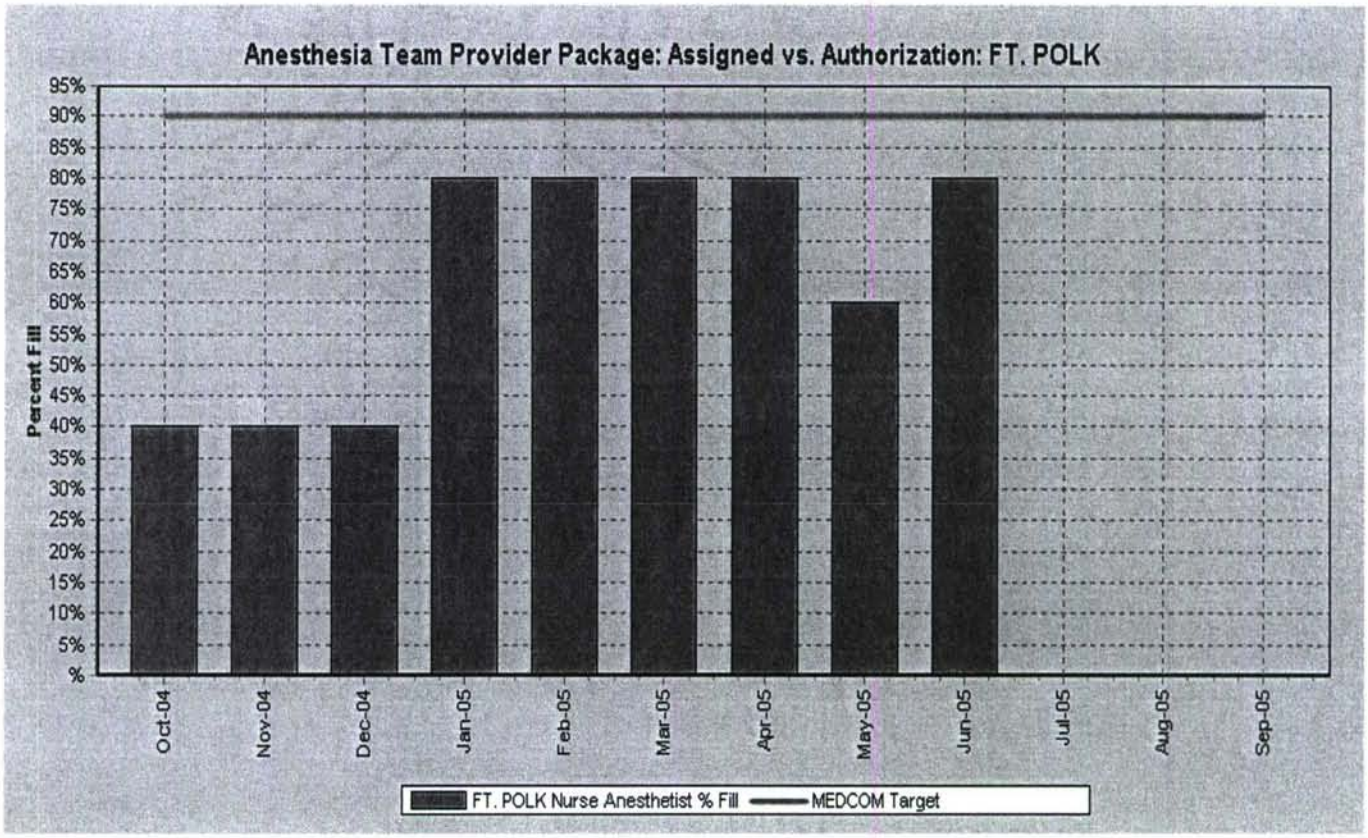
Non-financial Benefits: This initiative will enhance the services offered by this facility. This initiative would recapture a population lost to purchased care inclusive of hospitalization, and follow-up care.

Projected Gain: The projected gain is over 900 OR cases annually. This would be converted into RVUs for Same day Surgery, and RWPs for hospitalization increasing the hospital productivity, by increasing capacity. With an additional OR we would increase bed days by 777, totaling 2331 bed days. This would be an increase from 341.88 RWPs to 512.82 RWPs for FY06.

COST: The cost for a contract CRNA is $237,719.76

Productivity Monitoring Plan: Resource Management in conjunction with the Clinical Services Division will monitor productivity on a quarterly basis, and present this at the Commands quarterly R&A.

Attachments: Anesthesia Team assigned vs. authorized (CMS).



OBGYN Jump Start Initiative

SITE: BJACH, Ft. Polk, LA.
POC: Gerald C. Mitchell, C, Management Analysis, RM
Gerald.Mitchell@amedd.army.mil
337.531.3072

Statement of Work and Background: The OBGYN Clinic has networked $96,996.41 of purchased care during FY05 for fiscal months one through seven (M2 data). Straight Lined to the end of FY05 equates to a total of $166,279.56 of lost revenue. This initiative will recapture a major portion of that lost revenue by utilizing a contract OBGYN Nurse Practitioner or Midwife. This facility will expect to see an increase in RVUs, through an increase in procedures. Additionally we would expect to see an increase in RWPs through admissions after complicated procedures are completed.

Goals and Objectives: The key factor to increase productivity in this department is to increase the number of procedural providers. OBGYN procedures accumulate more RVUs than an OBGYN office visit in the outpatient setting. In the inpatient setting more complicated procedures equates an increase in RWPs for that department due to the patient being admitted, and not observed. The goal of this initiative is to hire a contract level two provider to care for the client's office visit, and remove the level one provider to recapture procedures lost to purchased care. We estimate by removing the level one provider and focusing on procedures rather than office visits that productivity in this department will increase substantially.

Financial Benefits: Purchased care covers several areas of service referred by the parent MTF. A #11 = an office encounter, #22 = an outpatient encounter, and #21 = an inpatient encounter. Straight lined for FY05 that equates to 785.19 purchased care outpatient visits, or 1728.9867 simple RVUs. In the inpatient arena that equates to 55.88 purchased care admissions, or 1,030.8132 RWP's (M2 data). This facility fully expects to recapture a major portion of this purchased care population by the addition of a midlevel provider. Additionally we expect to see an internal increase of productivity due to the expansion of the department.

Non-financial Benefits: This is inclusive of recapturing a portion of our population that was lost to the private sector. It also promotes client continuity and enhances the services offered by this facility. This initiative will allow the provider panels to be expanded in this department with the addition of a second level provider.

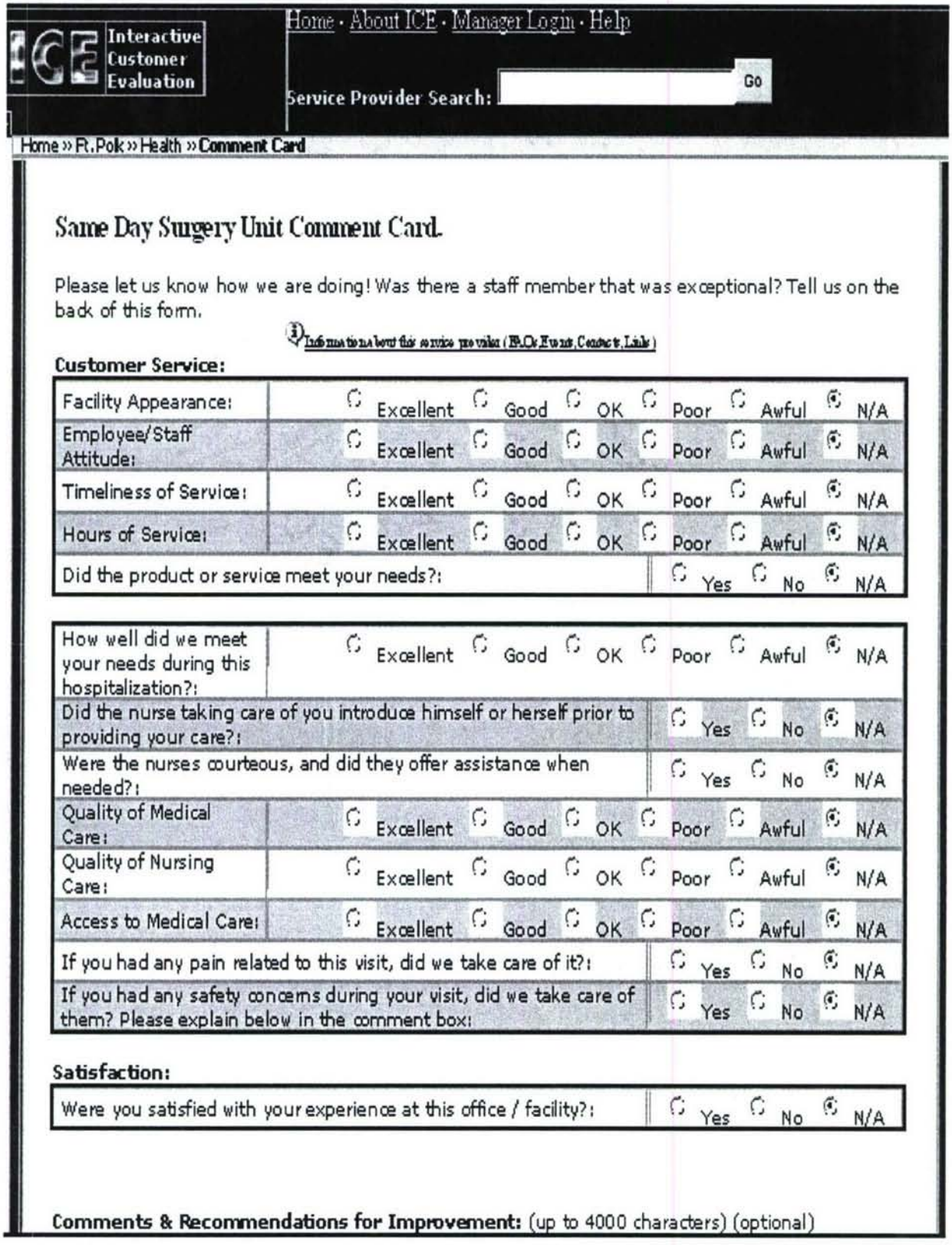
Projected Gain: The projected gain for RVUs would encompass an average of 1.5 RVUs per procedure totaling 12 RVUs per day at eight patients per day. This would accumulate 2,952 additional RVUs per year. The projected gain for RWPs is expected to increase as clients are admitted to this facility rather than observed.

COST: The cost of a Nurse Practitioner or Midwife to contract is approximately $117,000.00 per year

Productivity Monitoring Plan: Resource Management in conjunction with the Clinical Services Division will monitor productivity on a quarterly basis, and present this at the Commands quarterly R&A.

Attachments: M2 Data slide.

Appendix C. Interactive Customer Evaluation (ICE) Same Day Surgery Survey Form



ICE Interactive Customer Evaluation

Home · About ICE · Manager Login · Help

Service Provider Search: Go

Home » Ft. Polk » Health » Comment Card

Same Day Surgery Unit Comment Card.

Please let us know how we are doing! Was there a staff member that was exceptional? Tell us on the back of this form.

Information about this service provider (FAQs, Events, Contacts, Links)

Customer Service:

Facility Appearance:	Excellent	Good	OK	Poor	Awful	N/A
Employee/Staff Attitude:	Excellent	Good	OK	Poor	Awful	N/A
Timeliness of Service:	Excellent	Good	OK	Poor	Awful	N/A
Hours of Service:	Excellent	Good	OK	Poor	Awful	N/A
Did the product or service meet your needs?:				Yes	No	N/A

How well did we meet your needs during this hospitalization?:	Excellent	Good	OK	Poor	Awful	N/A
Did the nurse taking care of you introduce himself or herself prior to providing your care?:				Yes	No	N/A
Were the nurses courteous, and did they offer assistance when needed?:				Yes	No	N/A
Quality of Medical Care:	Excellent	Good	OK	Poor	Awful	N/A
Quality of Nursing Care:	Excellent	Good	OK	Poor	Awful	N/A
Access to Medical Care:	Excellent	Good	OK	Poor	Awful	N/A
If you had any pain related to this visit, did we take care of it?:				Yes	No	N/A
If you had any safety concerns during your visit, did we take care of them? Please explain below in the comment box:				Yes	No	N/A

Satisfaction:

Were you satisfied with your experience at this office / facility?:	Yes	No	N/A

Comments & Recommendations for Improvement: (up to 4000 characters) (optional)

If you would like a response, please check the Response Requested checkbox and enter your name and your phone number and/or your email below. Unless a response is requested, name, phone and email are optional.

Response Requested

Name: (optional)

Phone: (optional)

Email: (optional)

Reference Number: (optional)

Privacy Advisory: The information you provide will be used to improve our service. The contact information, if you provide any, will only be used to respond to your request for information. If you do not provide any contact information, your identity will remain unknown. However, all comments will be reviewed whether or not you identify yourself.

Thank you for taking the time to complete this comment card. Your opinions are very important to us.

OMB 0704-420, **expires 31 Aug 2006**
RCS DD-DA&M(AR)2124, **expires 30 Apr 2007**

Appendix D. Interactive Customer Evaluation (ICE) Summary Report

ICE Reports - Question Summary for Same Day Surgery Unit.

Date Range of report: 18 Jul 05 to 09 Oct 05
Question filters: None
Functional Categories: N/A

*ICE Required Questions			
Overall Satisfaction Question	Responses	% Satisfied	-
Were you satisfied with your experience at this office / facility?	128	99%	-
Standard Scale Questions	Responses	Average Rating	% Top Rating
Facility Appearance	133	4.76	77%
Employee/Staff Attitude	134	4.91	92%
Timeliness of Service	133	4.65	74%
Hours of Service	131	4.72	75%
Yes/No Questions	Responses	% Yes	-
Did the product or service meet your needs?	94	99%	-
Additional Questions			
Standard Scale Questions	Responses	Average Rating	% Top Rating
How well did we meet your needs during this hospitalization?	131	4.86	88%
Quality of Medical Care	133	4.89	89%
Quality of Nursing Care	132	4.93	93%
Access to Medical Care	131	4.86	89%
Yes/No Questions	Responses	% Yes	-
Did the nurse taking care of you introduce himself or herself prior to providing your care?	112	100%	-
Were the nurses courteous, and did they offer assistance when needed?	107	100%	-
If you had any pain related to this visit, did we take care of it?	93	96%	-
If you had any safety concerns during your visit, did we take care of them? Please explain below in the comment box	79	92%	-

Ratings are not meaningful until at least 25 responses have been entered.

Status Indicators:

Satisfaction and Yes/No Questions (Percentage):

● 100%-85% ▽ 84%-65% ● 64%-0%

Standard Scale Questions (Average Rating):

● 5.00-4.00 ▽ 3.99-2.75 ● 2.74-0

ICE Reports - Question Summary for Departments of Medicine/Surgery

Date Range of report: 18 Jul 05 to 09 Oct 05
Question filters: None
Functional Categories: N/A

*ICE Required Questions

Overall Satisfaction Question	Responses	% Satisfied	-
Were you satisfied with your experience at this office / facility?	2	● 0%	-
Standard Scale Questions	Responses	**Average Rating**	**% Top Rating**
Facility Appearance	2	● 4.50	50%
Employee/Staff Attitude	2	▽ 3.50	0%
Timeliness of Service	2	● 1.50	0%
Hours of Service	2	● 4.00	0%
Yes/No Questions	Responses	% Yes	-
Did the product or service meet your needs?	2	● 0%	-

Ratings are not meaningful until at least 25 responses have been entered.

Status Indicators:

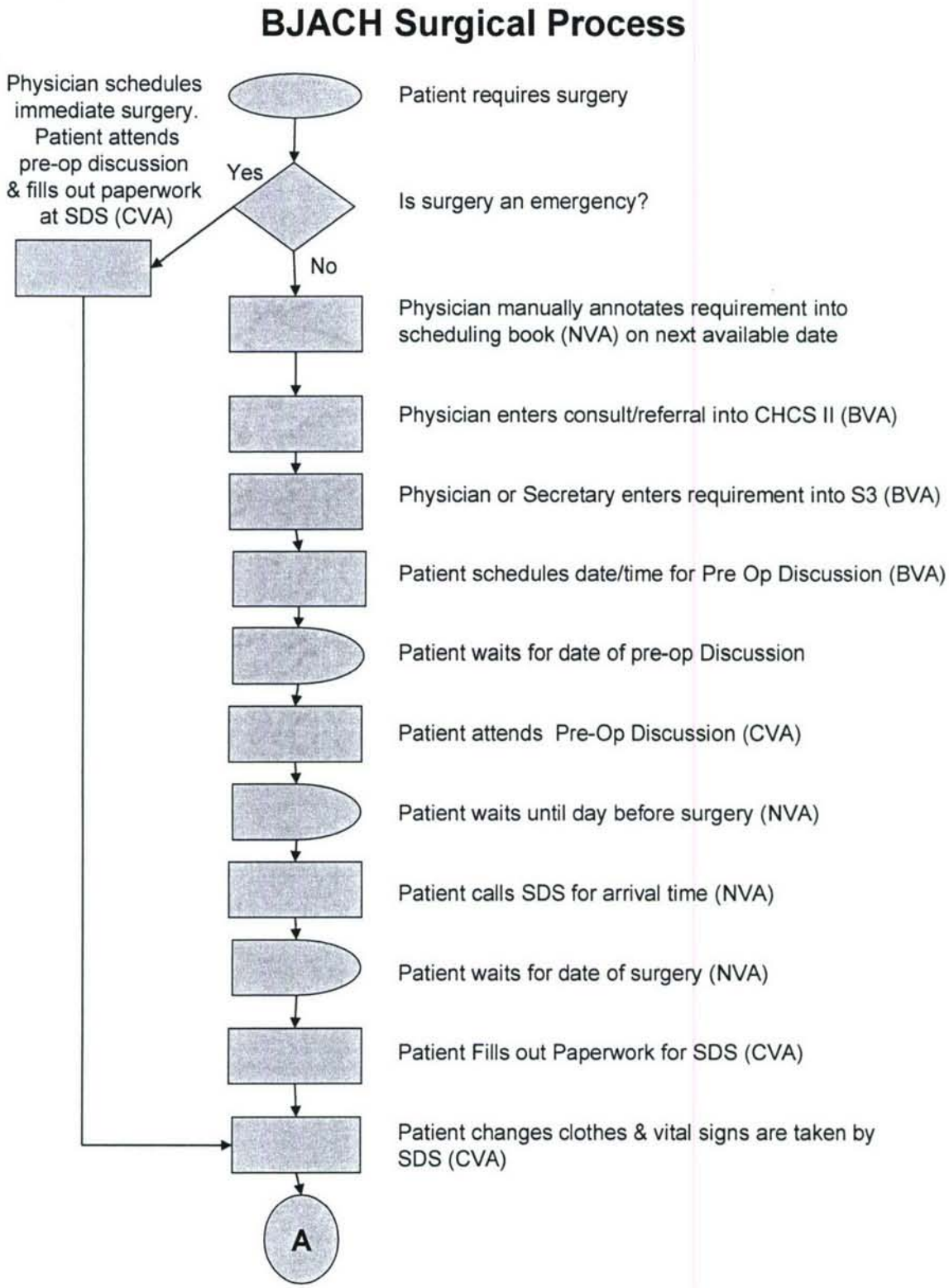
Satisfaction and Yes/No Questions (Percentage):

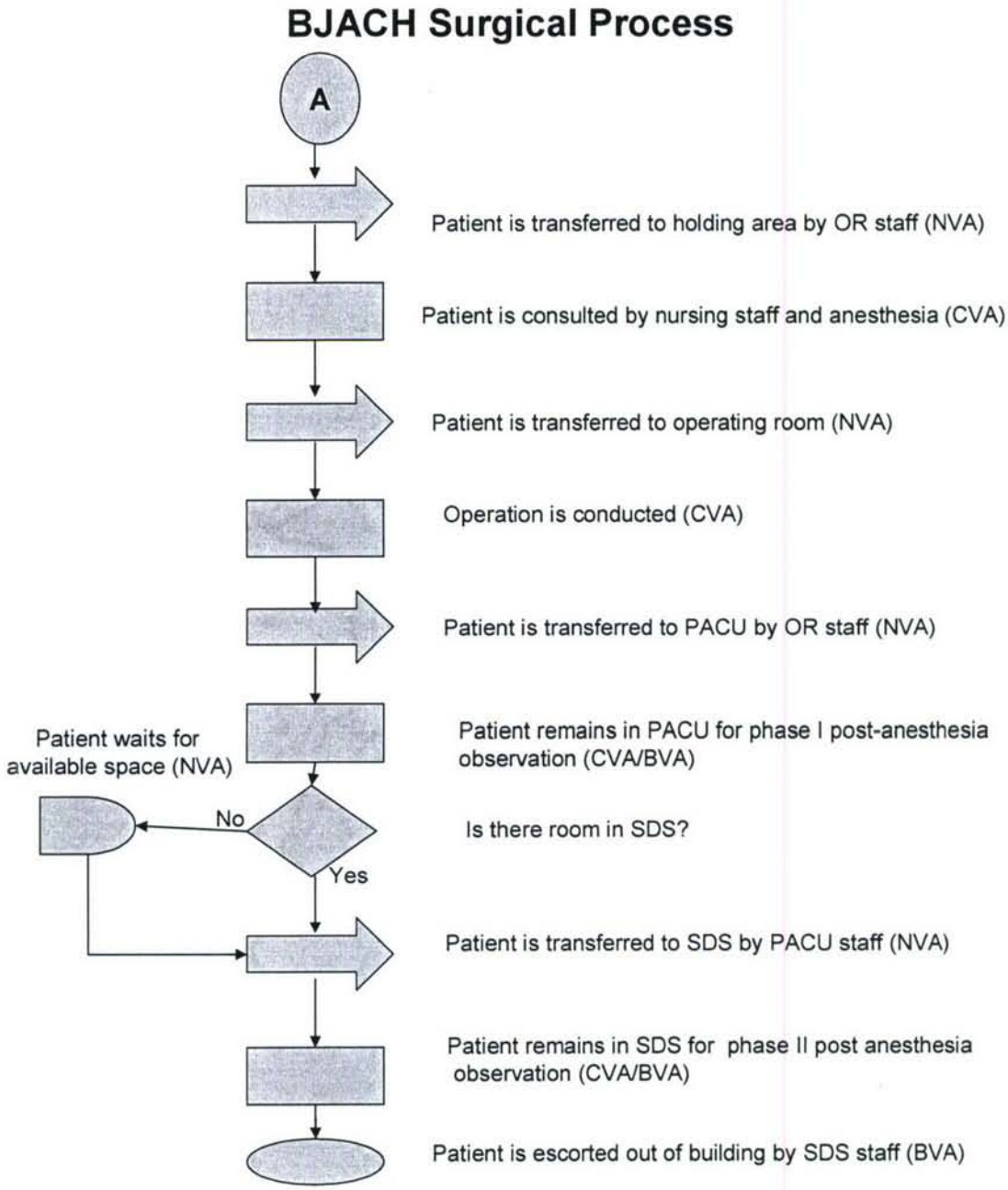
● 100%-85% ▽ 84%-65% ● 64%-0%

Standard Scale Questions (Average Rating):

● 5.00-4.00 ▽ 3.99-2.75 ● 2.74-0

Appendix E. Value stream map




BJACH Surgical Process
A
Patient is transferred to holding area by OR staff (NVA)
Patient is consulted by nursing staff and anesthesia (CVA)
Patient is transferred to operating room (NVA)
Operation is conducted (CVA)
Patient is transferred to PACU by OR staff (NVA)
Patient remains in PACU for phase I post-anesthesia observation (CVA/BVA)
Patient waits for available space (NVA)
No
Is there room in SDS?
Yes
Patient is transferred to SDS by PACU staff (NVA)
Patient remains in SDS for phase II post anesthesia observation (CVA/BVA)
Patient is escorted out of building by SDS staff (BVA)

Appendix F. Example of Operating Room block time schedule

OCT 2005 MATRIX1

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
						1
2	3 ORTHO Gen Surg	4 ORTHO EYE	5 Gen Surg Gen Surg	6 ORTHO ENT	7 ORTHO GYN	8
9	10 **HOLIDAY**	11 ORTHO EYE	12 Gen Surg Gen Surg	13 ORTHO ENT	14 ORTHO POD	15
16	17 ORTHO Gen Surg	18 ORTHO GYN ENT	19 ORTHO Gen Surg Gen Surg	20 ORTHO ENT	21 ORTHO GYN	22
23	24 ORTHO Gen Surg	25 ORTHO EYE GYN	26 ORTHO Gen Surg Gen Surg	27 ORTHO ENT	28 ORTHO POD	29
30	31 ORTHO Gen Surg					

AS OF: 21 SEPT 05

MAJ MORRIS
HEAD NURSE , OPERAING ROOM

Appendix G. Descriptive statistics surgical related admissions and encounters performed at BJACH, July 2004-2005

Descriptive Statistics of Surgical-related Admissions and Encounters at BJACH for Active duty and TRICARE Prime enrollees not associated with an emergency room visit by Dispositioning MEPRS code

	Direct Care		
	M	SD	n
Relative Weighted Product, Total	1.18	0.73	532
Obstetrics(ACB)	0.80	0.10	158
General Surgery (ABA)	1.35	0.82	90
Internal medicine (AAA)	1.75	0.86	75
Gynecology(ACA)	0.97	0.12	69
Family practice obstetrics (AGC)	0.79	0.12	66
Orthopedics(AEA)	1.76	1.03	43
Family practice medicine (AGA)	2.04	0.95	20
Podiatry (AEB)	1.56	1.04	4
Oral Surgery(ABF)	1.39	0.44	3
Pediatrics(ADA)	0.72	0.06	2
Opthamology(ABE)	1.45	N/A	1
Otolaryngology(ABG)	0.96	N/A	1
Relative Value Unit, Total	6.17	3.67	2480
Orthopedic(BEA)	7.79	3.93	933
General Surgery(BBA)	5.21	2.94	855
Otorhinolaryngology(BBF)	4.25	3.41	369
Opthalmology(BBD)	6.92	1.81	154
Gynecology(BCB)	5.29	3.39	124
Podiatry(BEF)	6.00	3.31	45

Note. 1 July 2004 to 31 July 2005.

Appendix H. Top 10 Facilities receiving referrals or consults from BJACH, July 04-05.

Table 1

Top 10 facilities receiving referrals or consults from BJACH

Name of Practice	Number of Patients	Service provided
Provider not indicated	176	Unknown
Orthopedic Center of Louisiana LLC	85	Orthopedic Surgery
Dr. Thomas C. McClure	57	Plastic surgery
LSU Health Science Center Shreveport	28	Mixed Specialty Clinic
Dr. Hemant Pande	22	Gastroenterology
Byrd Medical Clinic	19	Mixed Specialty Clinic
Unknown	18	Urology
Dr. Guru P. Ghanta	17	General Surgery
Leesville Cardiology Center Inc	17	Cardiovascular surgery
Mid Louisiana Surgical Specialist	14	Mixed Specialty Clinic
Dr. Randall Brewer	12	Neurology

Note. 1 July 2004 to 31 July 2005.

Appendix I. Inpatient Purchased Care claims data

Descriptive Statistics of Purchased care Surgical-related Admissions and Encounters for Active Duty and TRICARE Prime enrolles that were not associated with an emergency room visit by Major Diagnostic Category

Major Diagnostic Category	RWP			Claims		
	M	SD	n	M	SD	n
Diseases and Disorders of the Nervous System	1.87	1.51	22	$8,000.56	$10,856.55	21
Diseases and Disorders of the Eye	1.67	0.93	2	$4,571.93	$3,158.62	2
Diseases and Disorders of the Ear, Nose, Mouth, and Throat	0.76	0.19	3	$2,248.64	$524.27	3
Diseases and Disorders of the Respiratory System	1.41	1.34	16	$11,629.09	$14,540.67	16
Diseases and Disorders of the Circulatory System	2.68	3.15	69	$8,381.31	$13,293.82	69
Diseases and Disorders of the Digestive System	1.44	1.07	24	$4,587.53	$3,901.90	24
Diseases and Disorders of the Hepatobiliary System and Pancreas	1.81	1.61	14	$4,221.75	$4,219.86	14
Diseases and Disorders of the Musculoskeletal System & Connective Tissue	1.61	0.80	90	$5,122.36	$4,223.06	88
Diseases and Disorders of the Skin, Subcutaneous Tissue and Breast	1.15	0.26	2	$3,730.15	$1,405.39	2
Endocrine, Nutritional and Metabolic Diseases and Disorders	1.85	0.73	25	$5,995.97	$2,990.88	25
Diseases and Disorders of the Kidney and Urinary Tract	2.51	5.00	10	$8,649.84	$19,932.38	10
Diseases and Disorders of the Male Reproductive System	0.80	1.14	2	$2,546.39	$3,601.14	2
Diseases and Disorders of the Female Reproductive System	1.09	0.28	46	$3,638.22	$2,262.84	46
Pregnancy, Childbirth, and the Puerperium	0.68	0.36	59	$1,801.41	$1,159.73	57
Newborns and Other Neonates with Conditions Originating in Perinatal Period	1.07	1.43	4	$6,898.16	$11,561.81	4
Diseases & Disorders of the Blood, Blood Forming Organs, Immunological Disorders	1.09	0.68	7	$3,422.30	$3,191.14	7
Myeloproliferative Diseases and Disorders, Poorly Differentiated Neoplasm	4.98	1.98	18	$7,442.30	$6,887.22	15
Infectious and Parasitic Diseases, Systemic or Unspecified Sites	7.35	10.29	3	$26,653.01	$40,222.86	3
Total	35.85	32.75	416.00	$119,540.91	$147,934.13	408.00

Note: July 1, 2004 - July 21, 2005

* Acuity of service and secondary procedures were not considered

Appendix J. Outpatient Purchased Care claims data

Descriptive Statistics of Purchased care outpatient procedures for Active Duty and TRICARE Prime enrollees that were not associated with an emergency room visit

Specialty	Total RVU			Total claims		
	Mean	SD	n	Mean	SD	n
Service performed at BJACH*						
Facility charges for outpatient services	3.45	10.87	1716	$396.07	$989.07	1716
Podiatry - Surgical Chiropody	1.15	1.77	505	$60.91	$124.45	505
Orthopedic Surgery	6.19	6.51	297	$344.53	$361.53	297
Obstetrics/Gynecology	3.70	3.92	292	$217.60	$191.01	292
Gastroenterology	2.52	2.25	235	$183.09	$168.29	235
Otology, Laryngology, Rhinology	2.60	2.19	230	$153.82	$124.95	230
General Surgery	7.82	7.41	198	$565.25	$1,314.78	198
Anesthesiology	4.11	9.83	134	$196.20	$151.23	134
Anesthesist	5.34	6.76	4	$241.32	$320.67	4
Radiology	2.76	2.86	137	$189.75	$174.97	137
Optometrist	2.20	2.12	99	$109.27	$119.80	99
Opthalmology	7.15	4.61	88	$379.45	$349.48	88
Medical Supply Co	1.45	1.41	5	$81.16	$102.16	5
Oral Surgery	1.13	1.36	4	$299.51	$148.02	4
Independent Laboratory	0.08	0.02	4	$2.01	$0.69	4
Pathology	0.67	0.68	4	$88.87	$99.42	4
Registered Nurse	11.21	N/A	1	$514.79	N/A	1
Service not provided at BJACH						
Urology	2.33	3.89	433	$142.07	$209.45	433
Neurosurgery	11.98	9.62	199	$580.43	$556.74	199
Cardiovascular Disease	5.48	6.48	72	$322.33	$752.17	72
Neurology	0.99	0.37	54	$52.42	$34.66	54
Plastic Surgery	10.57	8.72	44	$564.31	$535.45	44
Thoracic Surgery	14.95	11.86	34	$669.36	$652.27	34
Endocrinology	6.88	7.02	31	$367.23	$260.56	31
Pulmonary disease	2.76	0.82	4	$119.45	$98.15	4
Nephrology	3.94	2.01	2	$370.54	$253.46	2
Proctology	0.97	N/A	1	$101.48	N/A	1
Unknown	0.09	0.00	3	$2.57	$0.06	3
Grand Total	3.94	8.14	4830	$296.05	$700.52	4830

Note. July 1, 2004 - July 31, 2005
* Acuity of service and secondary procedures were not considered

Appendix K. Definition of Terms

Throughout the course of this study, the following operational definitions apply.

Anesthesia start time – the time that anesthesia is started on the patient. Anesthesia is started on a patient in the holding area while the operating room is being prepared and cleaned. Amount of time varies by type of anesthesia required (Appendix O).

Block time – the amount of time allocated to a specific surgical service per day, usually allocated to one service from 0730-1530.

Case – the surgical experience of one patient

In-room time – the actual time the patient enters the operating room.

Minutes available – the number of minutes available to conduct surgeries per block time. An eight hour day has 480 minutes available.

Minutes used – the number of minutes that occur from anesthesia start time to out of room time.

Minutes used per operating room per day – the actual number of minutes used by a particular surgical service by day by operating room.

Operating Room useage by case – the number of minutes used by a surgical service to complete one case from anesthesia start time to out of room time.

Out of room time – the actual time the patient leaves the operating room.

Surgical service – one of eight classifications of surgeries, General Surgery, Gynecology, Obstetrics, Ophthalmology, Orthopedics, Otorhinolaryngology, Oral Surgery, or Podiatry.

Turn over time – the amount of time required to prepare the operating room for the next patient. This includes time to clean and gather equipment. Amount of time needed varies based on case difficulty.

Utilization rate – Amount of time scheduled for surgery divided by the amount of time utilized

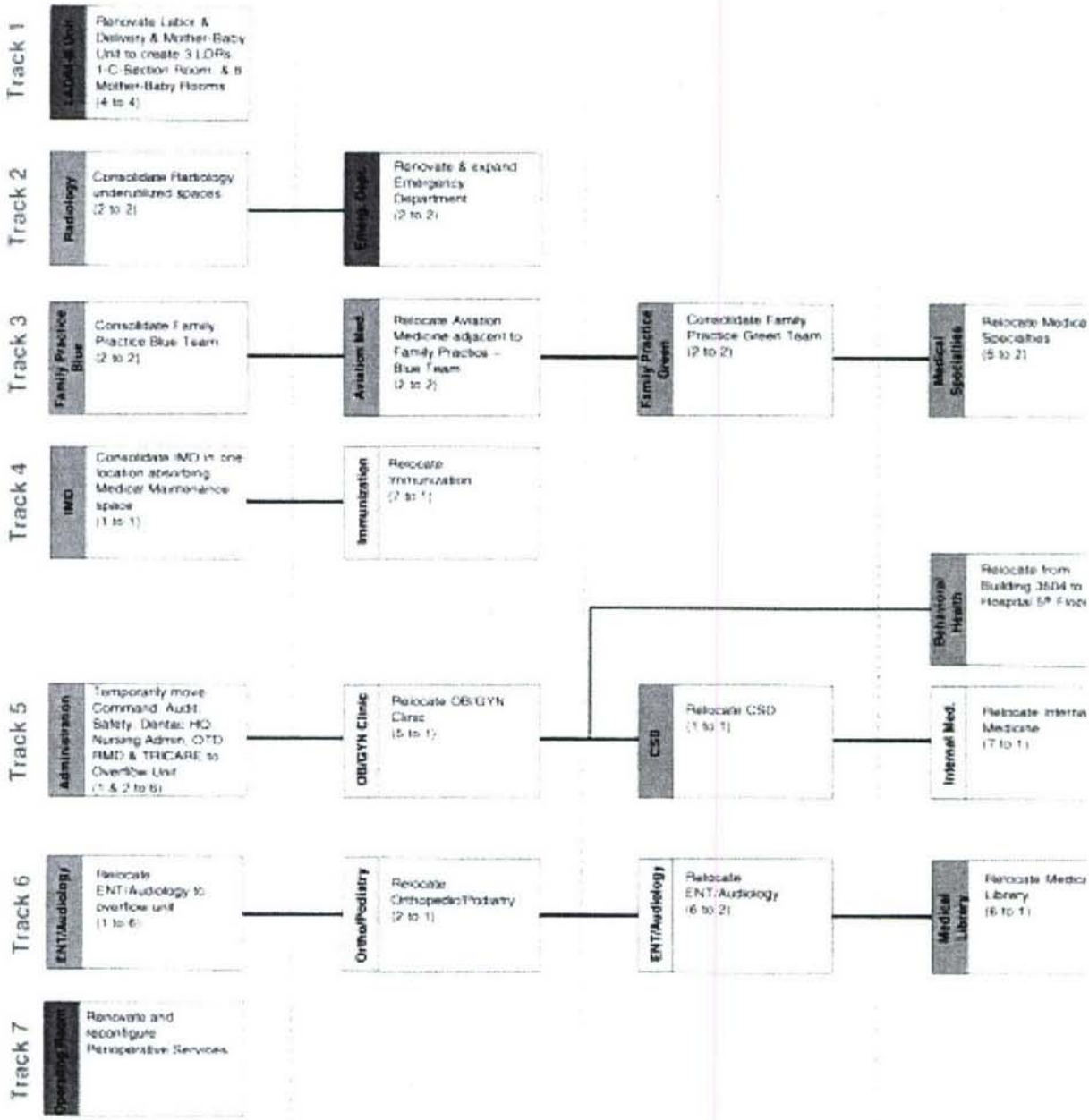
Appendix L. Assigned and available staffing of perioperative services.

Name	Grade	Staff Member	Auth	Available										
				July	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
		Dept. of Surgery												
SHAPIRO, ANDREW J.	O5	C, DEPT SURG	1											
	E6	HEALTH CARE SG	1											
ALLIGOOD, FLAVIUS L.	GS-11	SPV CLIN NUR	0											
		Anesthesia												
	O5	C, ANES NUR	1											
AUSTIN, KENNETH R.	O4	ANESTHESIOLOG	1											
	O4	NURS ANES	1											
ATKINS, JAMIE M.	O3	NURS ANES	1											
PHILLIPS, DOUGLAS A.	O4	NURS ANES	1											
	O3	ANESTHESIOLOG	0											
DEVLIN, RAYMOND J.	O3	NURS ANES	1											
TOVAL, WANDA Q.	GS-6	PRAC NURSE	1											
	GS-6	PRAC NURSE	0											
MCLEOD, TOM		CRNA	0											
LACOMBE, DOUG		CRNA	0											
HENDERSON, CRAIG	O2	NURSE ANES	0											
ROBINSON, WILLIE	E7	Or Nco	0											
WHEELER, WILLIE	E7	Med Nco	0											
		General Surgery												
	O4	C, GEN SURG	1											
HYDE, RONALD	O4	GEN SURG	1											
	E6	HEALTH CARE SG	1											
	14	MED OFF (GP)	0											
	10	CLIN NURSE	0											
	10	CLIN NURSE	0											
MARIN, JILL G.	GS-6	PRAC NURSE	1											
PETTY, HEIDI	GS-6	PRAC NURSE	1											
	GS-6	PRAC NURSE	0											
ALBERT, BENJAMIN	E5	MED NCO	0											
HENRY, SABRINA	E7	Med Nco	0											
		Obstetrics/Gyn												
ZAMBONICUTTER, KATH	O6	C,OB/GYN	1											
FOXWORTH, KECIA L.	O5	OB/GYN	1											
SEILER, ROBERT J.	O4	OB/GYN	1											
BAINES, TWANNA L.	E4	HEALTH CARE SP	1											
LOCKWOOD, CATHARINE	10	CLIN NURSE	1											
	10	CLIN NURSE	0											
	10	NUR PRAC OB	0											
HARDY, RACHEL	GS-6	PRAC NURSE	1											
BRACK, ELIZABETH A.	GS-6	PRAC NURSE	1											
RECRUITING	GS-6	PRAC NURSE	1											
DALME, ELAINE M	GS-4	NURS ASST	1											
	GS-4	NURS ASST	0											
FLETCHER, JEREMY	E5	Pt Nco	0											
BECKWITH, ANDREW	O3	OB/GYN	0											
POLK, JANNAN	E4	Med Sp	0											
		Opthalmology												
HAMMOND, MATTHEW D.	O4	OPHTHALMOL	1											
QUINN, SHARON	E6	EYE SGT	1											
LAVENHOUSE, EARL G.	E5	EYE SGT	1											
		Orthopedics												
CLARK, DAVID A.	O5	C,ORTHO	1											
HERMENAU, SHAWN	O4	ORTHO SURG	1											
GAFFNEY, WILLIAM	O4	PHYS ASST	1											
	E6	ORTHO SGT	1											
THOMPSON, CHRISTOPHER	E5	ORTHO SGT	1											
	E4	ORTHO SP	1											
FERGUSON, LIMUEL F.	12	PHYS ASST	1											
BOYD, MARY K.	GS-7	HLTH TECH	1											
RECRUITING	GS-7	HLTH TECH	1											
GRANGER, SHAWN	O4	ORTHO SURG	0											
		Otorhinolaryngology												
LUCAS, JAMES B.	O4	OTOLARYNGOL	1											
HARLOW, TAMMY	GS-6	PRAC NURSE	1											
WILLIAMS, ANDREA	E6	ENT SGT	1											

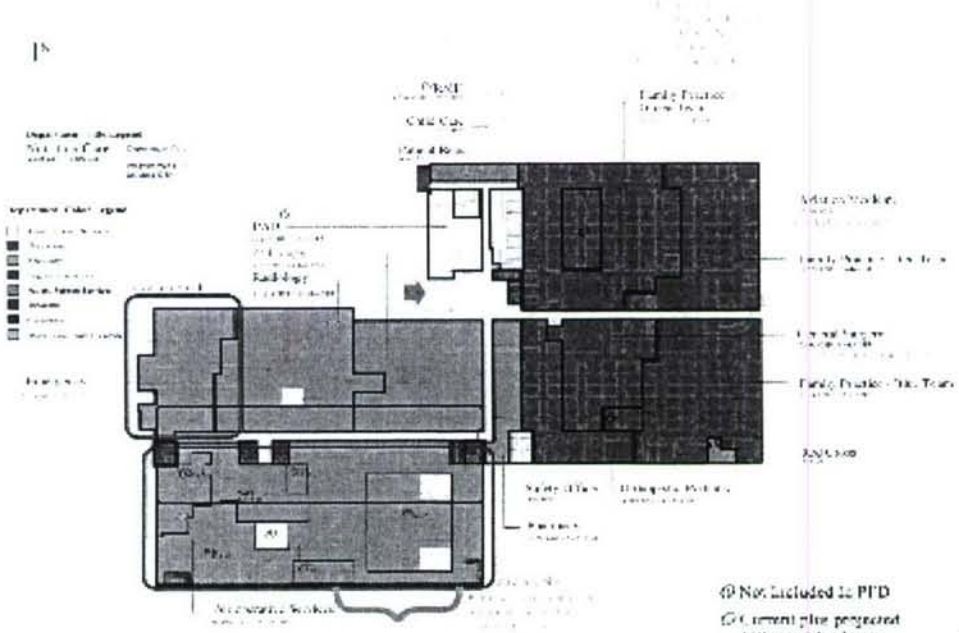
Appendix M. Reorganization Project flow chart

Bayne-Jones Army Community Hospital
Fort Polk, Louisiana

Reorganization Project Flow Chart



Appendix N. Map of second floor



Not Included in PFD

Current plan proposed MRI modified may require permanent reassessment.

Preoperative Screening SDS reconfiguration could improve process, staff efficiencies

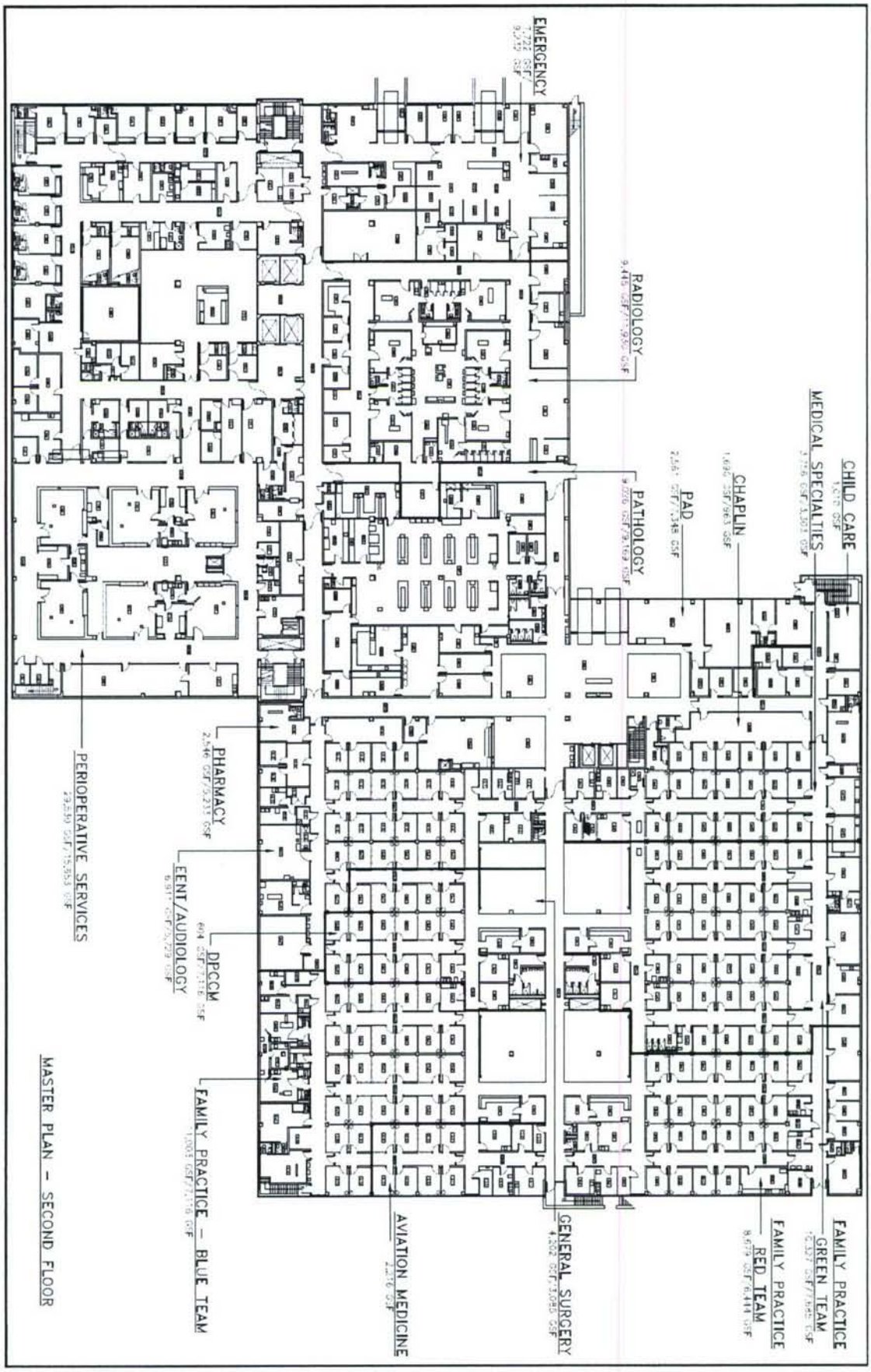
Open court with no access from interior

DPCOM

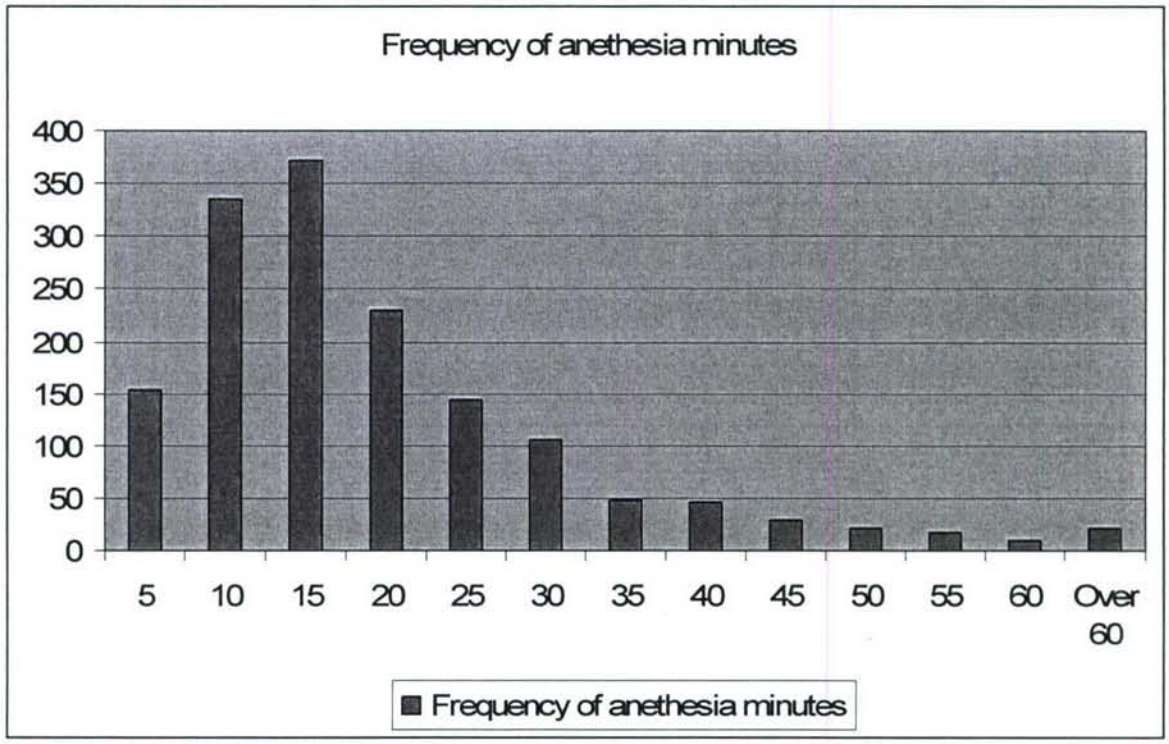
Part of RMD also located on first floor. Existing GSF indicated includes both floors.

Part of PAD also located on first floor. Existing GSF indicated includes both floors.

2 *Second Floor Plan*
Total Floor Area = ±21,313 GSF


EMERGENCY
RADIOLOGY
PATHOLOGY
PAD
CHAPLIN
CHILD CARE
MEDICAL SPECIALTIES
FAMILY PRACTICE
GREEN TEAM
FAMILY PRACTICE
RED TEAM
GENERAL SURGERY
AVIATION MEDICINE
FAMILY PRACTICE — BLUE TEAM
DPCCM
EENT/AUDIOLOGY
PHARMACY
PERIOPERATIVE SERVICES
MASTER PLAN – SECOND FLOOR

Appendix O. Minutes elapsing from holding area anesthesia administration to movement into the Operating Room



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